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CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES

SPECIAL SECTION

Creating A Global Enterprise

How To Get Into Shape For A Blistering Run In The World Market

ALSO INSIDE

Building A Better Sales Force

Reebok International Ltd.'s Tom Trainer

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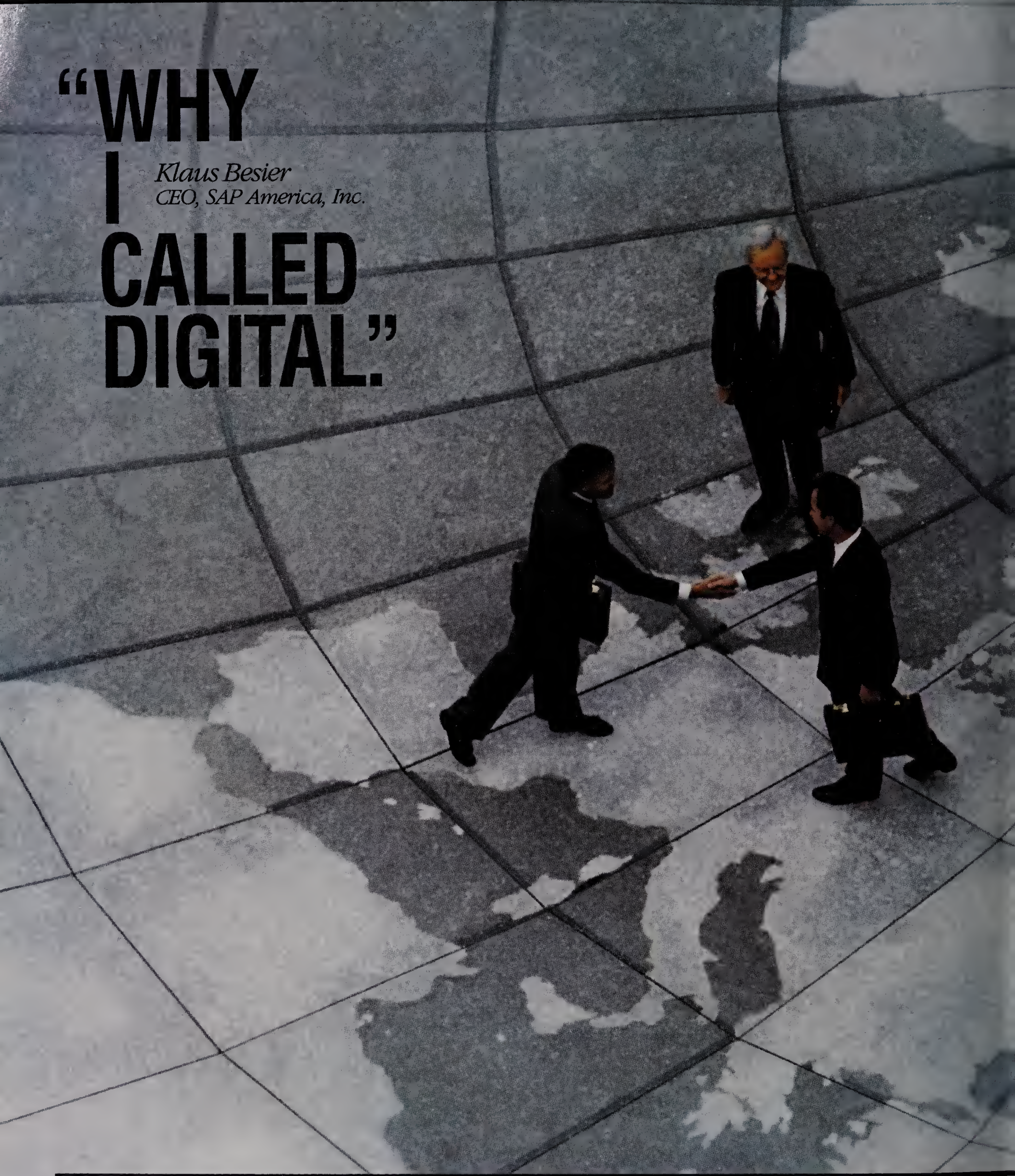
"WHY I CALLED DIGITAL."

Klaus Besier
CEO, SAP America, Inc.



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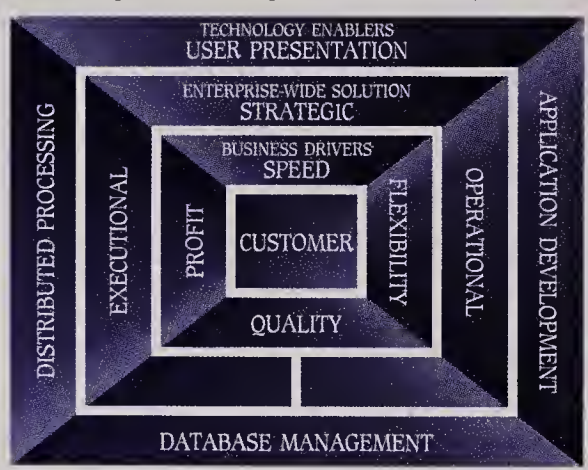

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CIO

VOLUME 7, NUMBER 16

SPECIAL SECTION

TAKING ON THE WORLD 39

Becoming a World Power 40

As new markets open up and improved communications put them within reach, global opportunities abound for U.S. firms. Making the most of them depends, to a large extent, on IS.
By Mickey Williamson

Uniting Nations 55

The robust technology infrastructure required to do business globally includes a strong backbone network and standards for just about everything.
By Mickey Williamson

World Travelers 67

Going global requires IS managers and their staffs to start thinking in a new way. Training, planning, salesmanship and a little sensitivity can all do wonders for the effort's success.
By Mickey Williamson

Globe trotters **40**
Cover photo by Peter Jordan/ Liaison International

FEATURES

REENGINEERING 30

Pursuing the Perfect Pitch

Reengineering is making its way through the organization and out to the front lines. Sales and marketing will never be the same.
By Megan Santosus

ARTIFICIAL INTELLIGENCE 72

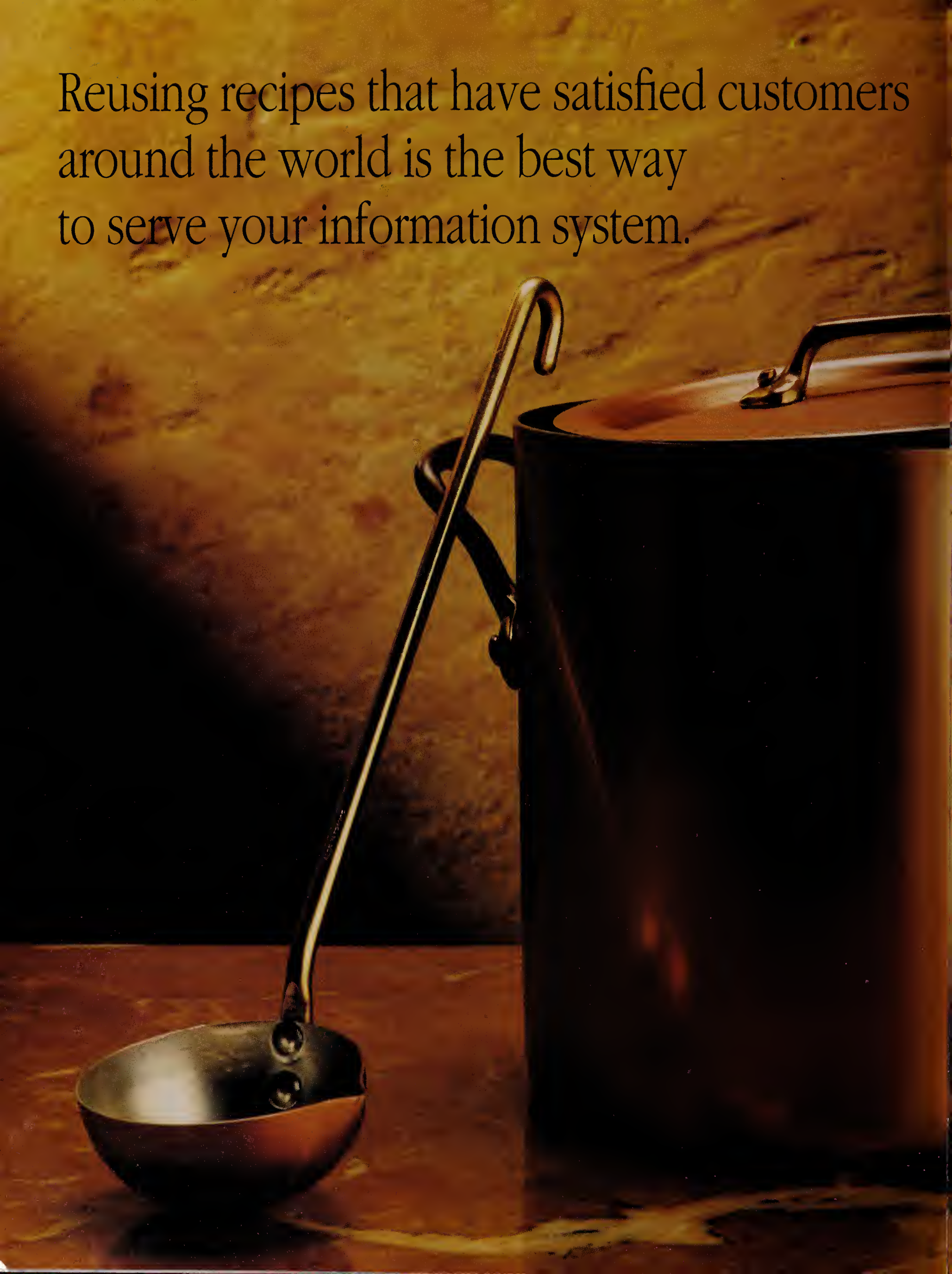
Artificial Ingredients

Deep within increasing numbers of business-critical applications dwells a knowledge-based kernel of code that makes a defining difference in the systems' capabilities.
By Sara Hedberg

The ways of the world **67**

MORE ▸▸▸

Reusing recipes that have satisfied customers around the world is the best way to serve your information system.



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COMPAQ

CIO

Unmixed messages **26**

COLUMNS

MESSAGING 26

INSIGHTS: THE MESSAGE AS MEDIUM

With messaging devices proliferating unchecked across major corporations, it is up to the CIO to rein in these disparate technologies—and their attendant costs.

By Ron Banaszek

Broad bandit patrol **80**

CYBERSPACE CADETS 80

CIO LIGHT: THE THIN BLUE MODEM

Meet cyberspace's finest, a trooper in the 21st century's Information Highway Patrol. His duty is to guard the fragile boundary between on-demand full-motion connectivity and anarchy....

By Stanley Bing

TOTAL QUALITY MANAGEMENT 86

STATE OF THE ART: QUALITY TEAM PLAYERS

A variety of software tools are available to help companies in the great quest for quality.

By John Edwards

TELECOMMUNICATIONS 98

WORKING SMART: A COHESIVE CURRICULUM

Uniting its many schools with a reliable telecommunications system was a principal goal at this Texas school district.

By Nancy Hitchcock

Broken records **16**

Behavior modification **16**

DEPARTMENTS

Editor's Letter 8

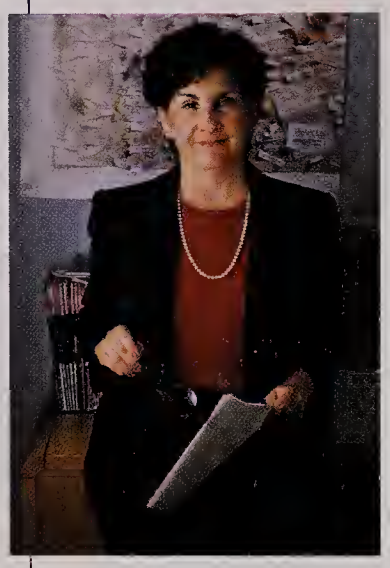
Publisher's Letter 12

Trendlines 16

- Calendar of events
- Deadbeat dads
- Technology marketing
- Remodeling previews
- Subliminal programming
- Untimely revelation
- Client/server survey
- Privacy practices

FYI 94

Index 96



There's a difference between international and global operations. This issue of *CIO* looks at the organizational and technological initiatives that are necessary to create a global perspective.

Traditionally, information executives at multinational organizations have met and consulted with their international counterparts, but they have rarely integrated applications throughout the business. However, the goal of global companies is to build and deliver better products and services more quickly regardless of where in the world the expertise and resources reside. This requires common systems and coordinated IT activities among international business units, according to Contributing Writer Mickey Williamson, who prepared the three stories that make up our in-depth look at the globalization phenomenon. (Please see "Taking on the World," beginning on Page 39.)

Also this month, we examine how companies are reengineering their sales and marketing functions. In the not-too-distant past, sales-force automation meant little more than equipping the sales group with laptops. It was regarded as a way to keep remotely located employees more in touch with corporate headquarters. But Staff Writer Megan Santosus reports that such trends as mass-customization, which greatly increases the volume of products available, and the need to provide customers with more-detailed information are pushing the reengineering effort. In the new sales organizations, the number of leads generated may no longer be the major indicator of success. (Please see "Pursuing the Perfect Pitch" on Page 30.)

As for artificial intelligence, its Hal-like image has long passed, and it is being incorporated into many applications. The productivity increases allowed by knowledge-based systems is impressive: In some cases, where only 15 percent of a system's code is devoted to AI, 80 percent of its value is derived from it. (Please see "Artificial Ingredients," beginning on Page 72.)

Finally, artificial intelligence move over. Today's futuristic view of technology revolves around a "plugged-in" society. This month, our new CIO Light column features an amusing and telling piece by *Esquire* columnist Stanley Bing. Is the concept mind-boggling, or is it the way society is evolving? You be the judge.

Marcia Blumenthal

CIO

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"American industry appears well-positioned to profit from a European recovery—perhaps more than the Europeans themselves. Many U.S. producers, especially those in high-tech fields, are finding weak European competitors give them a chance to grab market share."

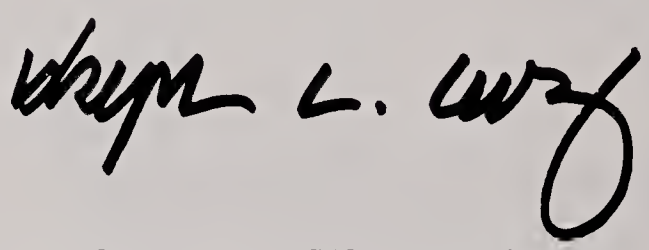
–The Wall Street Journal
April 4, 1994

It's hard to argue with *The Wall Street Journal*.

As trade barriers dissolve, telephone services become commonplace and generally reliable, and fax, E-mail and broadband communications make information swapping effortless, the temptation to go global is difficult to resist. And, according to some industry experts, it's a competitive must. (See our special section on the global enterprise, beginning on Page 39.)

As Europe lifts itself out of a stifling recession, many U.S. companies that have already been doing business there for a few years are beginning to see evidence of success. The emergence of this strengthening market has prompted *CIO* to take a more global approach in our coverage. By profiling both U.S. companies that operate globally and European companies, we hope to bring you insight and ideas on how different organizations are using information technology to effectively manage worldwide operations.

If you have any comments or suggestions regarding our new global coverage, please write and let us know what's on your mind.



P.S. Mark your calendar for the October 1994 CIO Perspectives conference. Jim Wetherbe will act as "master of ceremonies" as we explore "IT Economics: Business Value & Profit Maximization." The conference will take place Oct. 23-26 at La Paloma in Tucson, Ariz. Please call our toll-free conference hot line at 800 366-0246.

Coming In CIO

Adventures in Aerospace

With a 64 percent reduction in the domestic defense market since 1985, U.S. aerospace firms are looking to commercial markets for survival. But as these firms touch down in unfamiliar territory, they are encountering rules of business utterly alien to their experience. Where these companies once won contracts based on their reputations, they now must learn to compete on price and turnaround time.

The Growth Factor

Executives in growing organizations can't just sit back and enjoy the ride. To keep growth going, they must manage it. Much of the responsibility often falls to IS; but managers there simply don't have time to design a comprehensive architecture of neatly fitting pieces. Even if they did, it would quickly become obsolete. *CIO* talks to several rapidly growing organizations that are working to promote that growth while maintaining, improving and innovating.

Banking on IT

Banking may still be thought of as a decidedly button-down industry, but the recent spate of mergers and acquisitions suggests that individual firms are anything but stodgy when it comes to preparing for the future. It often comes down to the IS department to make sure that two formerly separate—and sometimes very different—organizations function as one.

PHOTO BY WEBB CHAPPELL

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CHILD-SUPPORT SYSTEMS

CATCHING DADDY LONGLEGS

Deadbeat dads and moms can run, but it's getting harder for them to hide. Under a federal mandate, all states must have fully automated systems to find and dun parents behind on child-support payments in place by Oct. 1, 1995. And several states already run innovative computer-assisted campaigns to ferret out offenders and collect overdue payments.

Because of rising divorce and out-of-wedlock birth rates, there's no shortage of scofflaws. Nationally, about 9 million adults—nearly 85 percent of them men—owe support for 17 million children, says Debbie Kline, regional director of the Association for Children for Enforcement of Support (ACES) Inc., a Toledo, Ohio, advocacy group. Total amount in arrears: $24 billion. And since parents who don't get their child-support payments often end up on public assistance, it's taxpayers who get stuck paying for the deadbeats' negligence.

For this reason, a number of states have started looking at new ways of electronically nailing cheats. In New Jersey, for example, when officials learned that 2,400 people would receive awards of up to $18,000 each in a class-action lawsuit, they checked a list of plaintiffs against a database of support scofflaws. More than 300 names matched. Ultimately, 197 award recipients coughed up $1.2 million in back payments.

But to comply with the federal mandate, systems must do more, says Arvind Malhotra, director of the public-sector division of Complete Business Solutions Inc. in Farmington Hills, Mich. Malhotra, whose company is building support-collection systems for several states, says enforcement, collection, distribution and even caseworker assignments must be automated.

Nor can states stop at their own borders when it comes to beefing up enforcement systems. In order to receive federal certification, they must also connect to the national Child Support Enforcement Network (CSENet, pronounced "sizz-net"), which allows them to exchange information on deadbeats who cross state lines. Malhotra describes the network as a central "mailbox" for inquiries about particular cases. If Michigan officials want help finding a fugitive father, for example, they send the information to CSENet in Washington, which transmits it nationwide. Other states can then comb their own records—taxes, property transactions,

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The messages are contained in text files that may be viewed and edited in a text editor such as Notepad, which is included with Windows. Each file contains about 40 suggestions that are displayed in succession and repeated continuously. The program can be customized by the user to control messages' frequency and duration.

A fully functional shareware version is available from the company for $3. Full registration costs $20 and includes 10 additional files, such as boosting sales, improving public speaking and attracting love. For information, call 800 453-0499.

ILLUSTRATION LEFT BY DIANE BIGDA; ILLUSTRATION RIGHT BY MARY ANNE LLOYD

HOW TO UNRAVEL THE CLIENT/SERVER MYSTIQUE.

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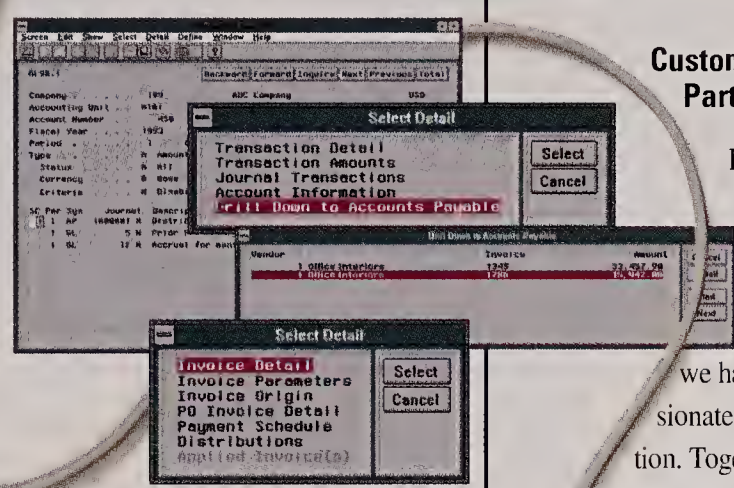

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motor-vehicle registrations—to see whether the missing parent has surfaced there. About half the states already have at least some level of access to the service.

Meanwhile, the Clinton administration is considering several related measures. One would require all newly hired workers to report support obligations on income-tax forms. That information would go into a nationwide database; the Internal Revenue Service could then be enlisted to help convince parents to pay.

TECHNOLOGY MARKETING

New Vendor Venues

Now that people are doing everything at the desktop short of having their gallbladders removed, more and more companies are looking for ways to sell their wares electronically. And not surprisingly, IT vendors are eager to lead the charge.

"Online systems and electronic commerce will foster change in the way companies sell their products and manage their customer relationships," says Tom Kehler, president and CEO of Connect Inc., which recently announced a partnership with Electronic Marketplace Systems (EMS) Inc. to develop an online service for connecting users and vendors of IT products. "With corporate online systems, barriers such as geography, different time zones and access to remote locations no longer stand in the way of buying and selling IT products."

The partnership will leverage Connect's virtual private network and EMS's experience as a marketing partner for high-tech companies (EMS is a subsidiary of International Data Group, the parent company of *CIO*).

Buyers and sellers might also want to check out *RE:SOURCE Network Solutions*, a CD-ROM-based publication from Pacific Bell Information Services. *RE:SOURCE* is a quarterly interactive catalog, magazine and purchasing system aimed at people who want to create or manage computer networks. The first issue is dedicated to networking products and services that are compatible with Apple Computer Inc. technology. Subsequent editions will include DOS- and Windows-compatible products.

The magazine section features how-to articles on configuring and optimizing networks, reviews of networking products, and audio- and video-enhanced

PACIFIC BELL'S *interactive catalog, magazine and purchasing system for network managers will be online by the end of the year.*

Private Practices

Hospitals are anxiety-provoking places. Not only do patients have to worry about authorized people poking around in sensitive areas of their anatomy; they also have to worry about unauthorized people poking around in their medical records.

According to a recent survey by Chicago law firm Gordon & Glickson, many hospitals aren't doing enough to protect the confidentiality of computer-based patient records. The study of IS chiefs at 260 hospitals nationwide pointed out glaring deficiencies in privacy-protection practices. For example, 47 percent of respondents said ex-employees can gain access to patient data 24 hours or longer after they are fired. Twenty-eight percent have no written policy on the use of patient information, and 19 percent do not require employees or outside consultants to sign confidentiality agreements.

In matters of systems security, while most hospitals use passwords and limit access, only 43 percent restrict what patient data can be printed, and the same percentage track sensitive information to see who is accessing it. Also, only 17 percent identify patients by number rather than by name in their databases.

Generally, larger hospitals and those serving urban communities have more controls in place. That's important because "large, urban hospitals have bigger databases that may contain more sensitive data, such as information on patients receiving drug-abuse and AIDS treatment," says Mark L. Gordon, a partner at the firm. Gordon stresses that patient-privacy issues are becoming increasingly critical as hospitals merge into community- and regional-provider networks, making their databases accessible to more people.

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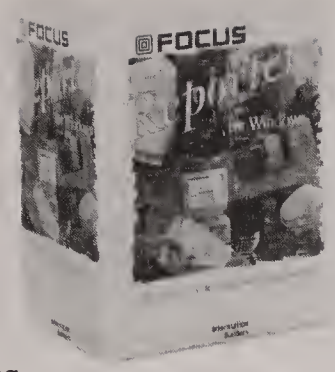

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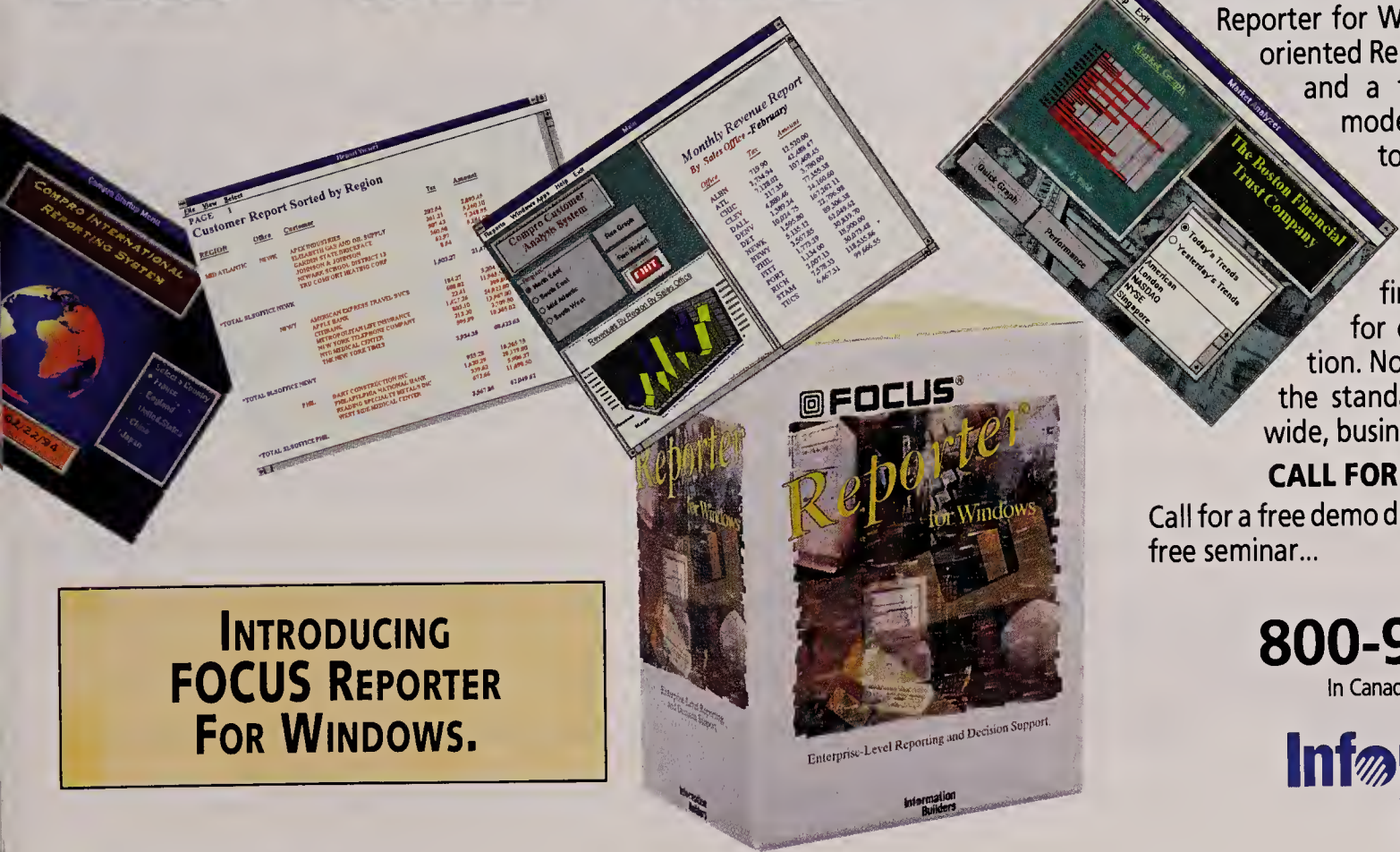

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demonstrations, explanations and interviews with industry leaders. The catalog section allows users to navigate through detailed information about more than 850 networking products. Presentations range from simple company and product listings to fully animated illustrations of network systems.

The company plans to offer *RE:SOURCE* online before the end of this year and will provide online transaction capabilities. A four-issue subscription costs $499. For information, call 800 303-PBIS.

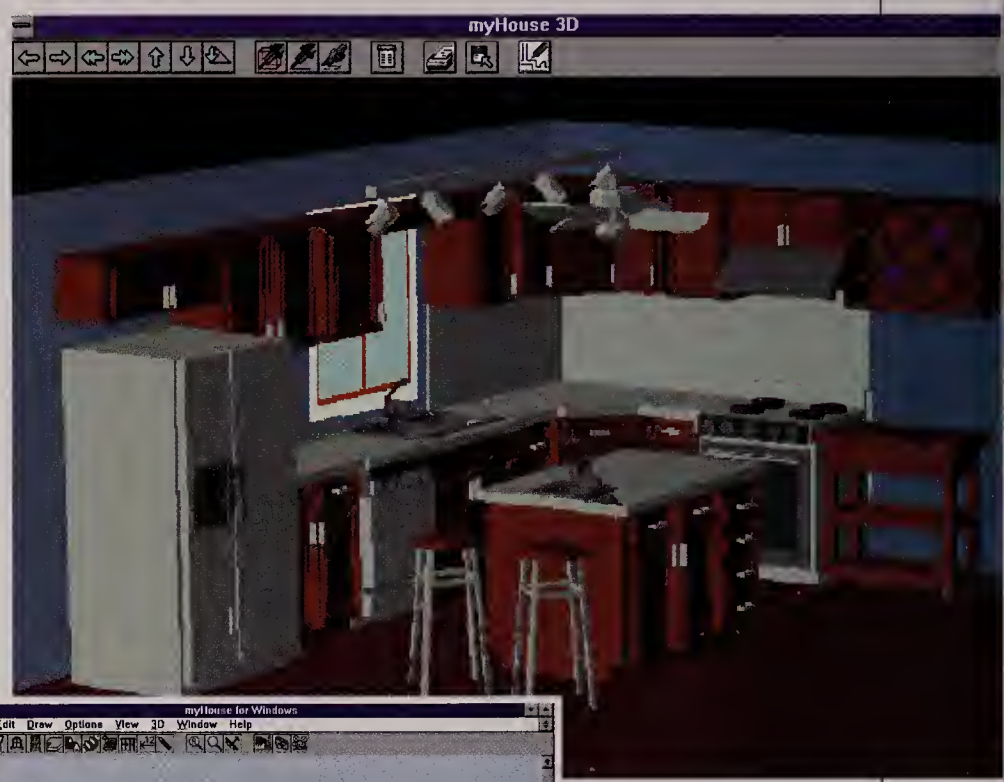
Recognizing similar opportunities to expand its reach to users, Digital Equipment Corp. is offering educational institutions and research laboratories an electronic pipeline to its goods and services. Now, users in these not-for-profit organizations can obtain descriptions of Digital's hardware, software and services, and read announcements of special offers and new products using the company's Internet Electronic Connection. U.S. customers can also use the service to configure systems, generate price quotes and place orders.

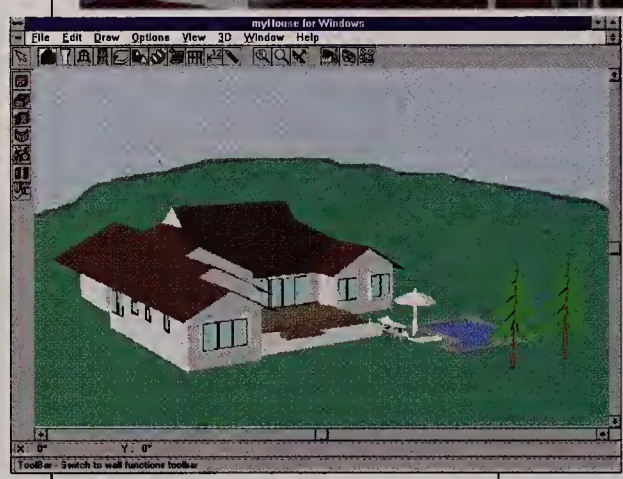
The company, which says it is the first computer vendor to offer its full product line over the Internet, is considering extending the service to commercial markets as well. Qualifying customers can register online for an Internet Electronic Connection account via telnet at telnet.educonnect.digital.com (Internet address: 192.206.36.1).

Home Movies

You've just spent a fortune renovating your kitchen and you suddenly realize that the window overlooks your neighbor's compost heap and that you can't open the dishwasher and the cutlery drawer at the same time. Those are the kinds of mistakes that could have been avoided if only you'd been able to walk inside the room before it was built.

Now myHouse, a 3-D home-design software package for DOS, offers users that capability—or at least the feel of it. The product's Movie Maker feature creates moving pictures of completed designs, allowing users to take self-guided tours of their new domiciles before driving the first nail.





MYHOUSE *gives users the impression of being able to move about inside simulated rooms.*

Users create individual rooms or entire houses onscreen, choosing from 256 colors and 340 predesigned objects. Once the design is finalized, they select the Movie Maker option from a menu. The feature creates a string of 3-D pictures, allowing users to visually stroll through rooms, look through windows and determine whether they can see the TV from the bathroom.

DesignWare Inc., the program's manufacturer, conceived the program exclusively as a home-design tool. But recently, company executives received a call from the office of the Texas attorney general. Apparently, in-

An Untimely Revelation

In the May 15 issue of *CIO*, we wrote about Kidder, Peabody & Co.'s portfolio-management system (see "A Timely Investment," Page 100). Since the story was reported, Kidder, Peabody has found itself embroiled in one of Wall Street's largest trading scandals. According to *Business Week* (May 2, 1994), the company is investigating "a two-year, $350 million, phony government bond trading scheme...." While the company's senior managers hold one of their top traders responsible, *Business Week* reports that "many on Wall Street are skeptical of [Kidder CEO Michael A.] Carpenter's 'We wuz robbed' explanation...."

The trader, Joseph Jett, was fired, and six other employees suspended from their jobs. Further actions could follow the results of an inquiry.

Questions raised by the scandal include how the firm failed to detect the scheme, and why Jett's boss never questioned him about how he was generating such large profits. "Kidder may have ignored the lesson learned by Salomon Brothers Inc. in the wake of the 1991 Treasury bond bid rigging scandal: Don't give too much power to traders."

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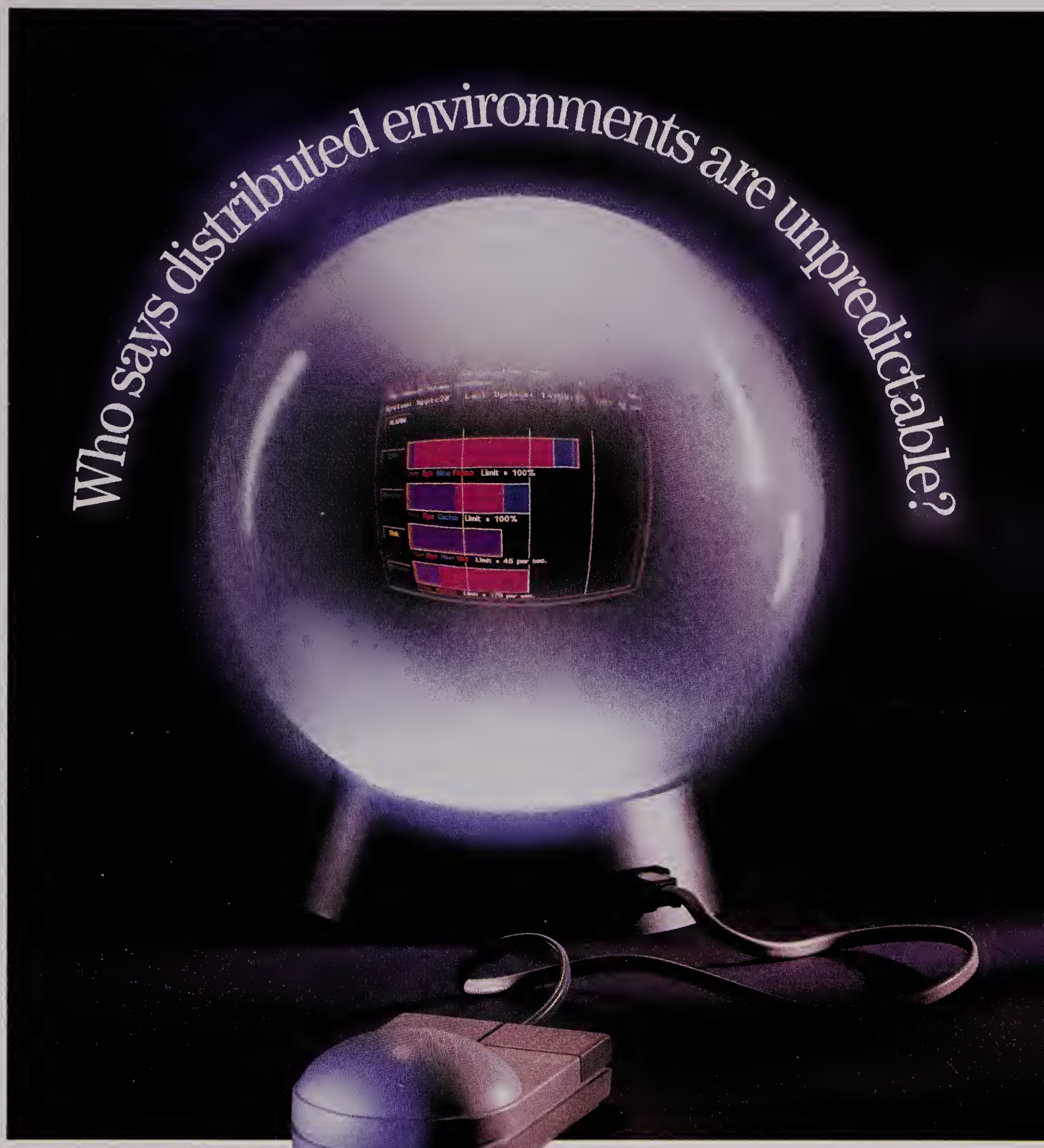

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vestigators there had been using the product to mock up and study crime scenes. An idea was born: DesignWare is now planning to release a new product called 3-D Eye Witness, a program similar to myHouse but "with different icons—knives, guns, chalk outlines, pools of blood," says Steve Webster, the company's vice president. Webster says the program will be sold by direct mail; he expects the market to be law-enforcement officials, insurance companies and crime hobbyists. For information, call 617 924-6715.

Client/Server, Here We Come

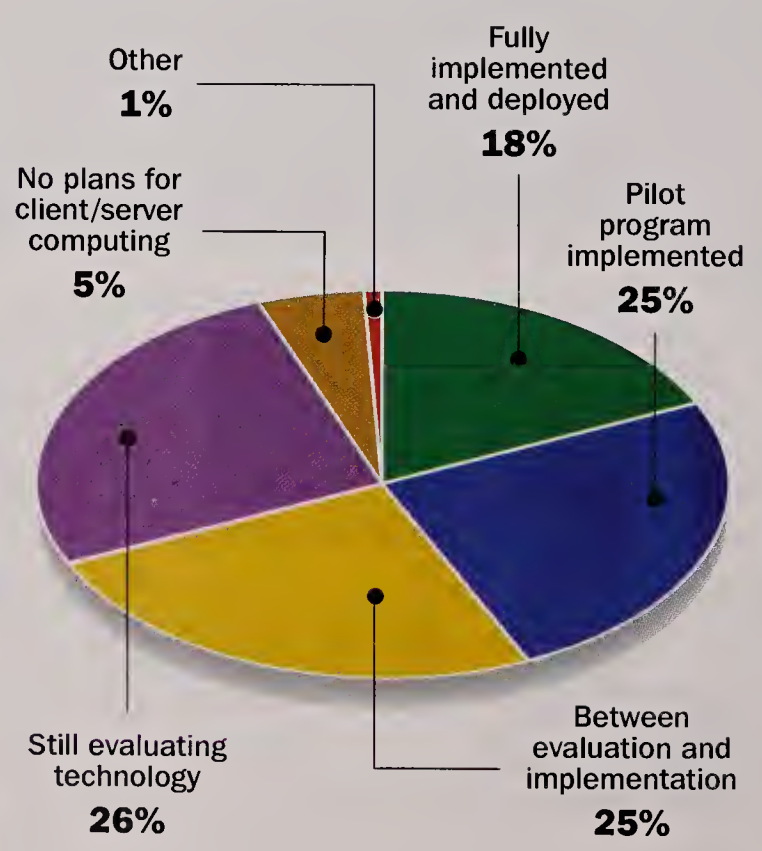
Companies may not know much about client/server, but they know that they like it. A recent report from Datapro, an information services group in Delran, N.J., confirms that considerable confusion still exists over the exact definition of client/server. But in a survey of close to 800 executives and computer professionals, 77 percent said they were evaluating, piloting or preparing to implement client/server systems; 18 percent reported fully implemented and deployed systems; and only 5 percent said they have no plans for or interest in client/server computing.

Other highlights of the survey:

- The two most frequently cited reasons for not having implemented client/server systems were technical difficulties (lack of expertise) and money issues (cost or budget restrictions).
- The three most frequently cited benefits of moving to client/server were easier access to corporate data, flexibility to meet business opportunities and the ability to move critical information anywhere for end-user access.
- The top three problems experienced during implementation involved lack of expertise, network-connectivity issues and organizational adjustments. Other frequently cited disadvantages included the need to invest in support and services and a lack of systems-management and -administration tools.
- IBM and IBM compatibles dominated both client and server hardware, followed by Apple Computer Inc. and Sun Microsystems Inc. (client hardware), and Digital Equipment Corp., Hewlett-Packard Co. and Sun (server hardware).

Status of client/server implementation

Nearly 800 executives and computer professionals indicate their companies' progress with client/server systems



EVENTS

CISR '94—Current Issues in Managing Information Technology: Organizing for the Future
Hyatt Regency Hotel, Cambridge, Mass.
June 13-16
The Center for Information Systems Research
617 253-8967
Aimed at senior-level IS managers, this session will address critical managerial, organizational and technical issues related to the role of information technology in today's business environment. Tuition: $2,400

High Performance Computing and Communications Conference
Sheraton Imperial Hotel & Conference Center, Research Triangle Park, N.C.
June 20-23
The Federation of Government Information Processing Councils
401 624-1723
This conference features a computer-technology showcase and tours of the North Carolina Supercomputer Center and the University of North Carolina's virtual-reality lab. Also included are a half-day high-performance computing tutorial and technical presentations. Registration: $450

Database & Client/Server World
John B. Hynes Convention Center, Boston
June 28-30
DCI
508 470-3880
This conference and exposition, which is dedicated to client/server computing and database technologies, consists of 11 separate conferences. A special one-day session designed for CIOs will focus on client/server management issues. Registration: $495-$5,495

Information Strategy Planning
Marriott Courtyard, Denver
July 6-8
Performance Development Corp.
800 554-9131
This seminar will explain how CIOs can align their information strategy with an overall business strategy to achieve competitive advantage. Registration: $1,095

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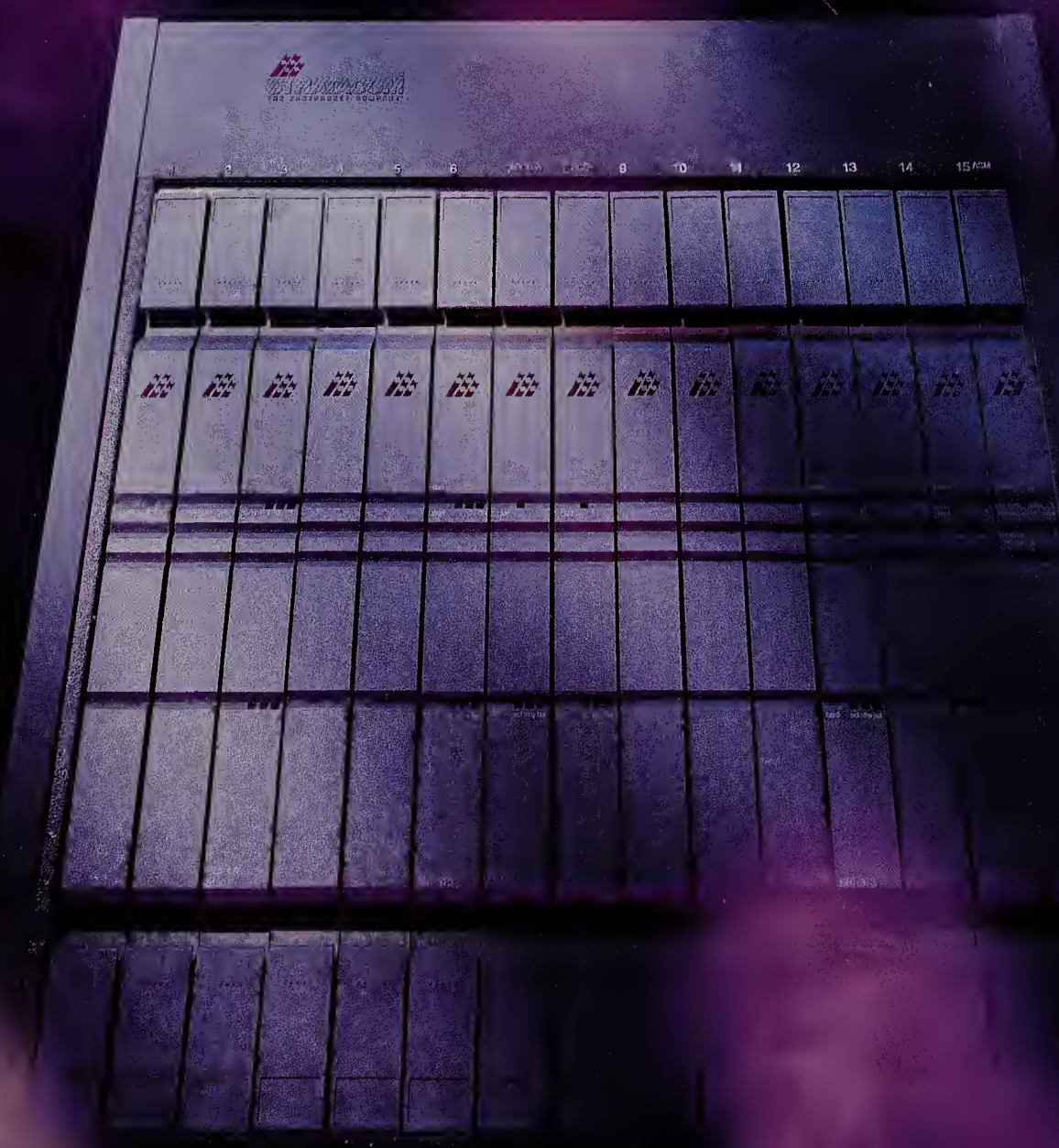

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The Message as Medium

With messaging devices proliferating unchecked across major corporations, it is up to the CIO to rein in these disparate technologies—and their attendant costs

BY RON BANASZEK

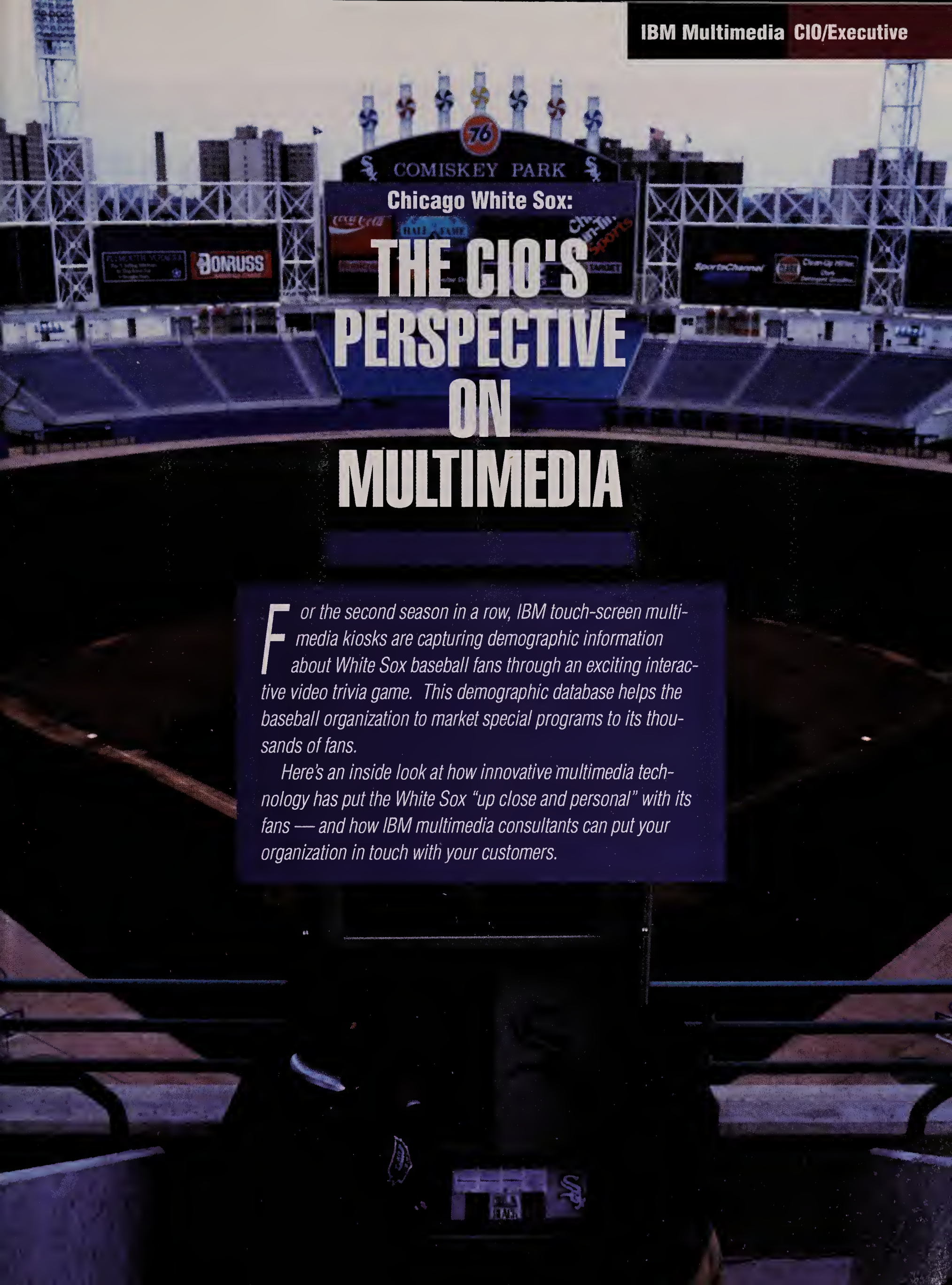
Large, multinational corporations need reliable communications capabilities to carry out their daily operations. A crucial subset of communications technology is messaging—devices like fax, voice mail and E-mail that allow information to be deposited in some type of mailbox for review at the recipient's convenience. Yet, increasingly organizations are plagued by the confusion and inefficiencies wrought by various standalone messaging systems purchased by independent units and running on different platforms. At the same time, these corporations are experiencing surging communications costs as fax machines proliferate and employees use them without giving a second thought to the charges they are incurring. For CIOs trying to optimize internal communications and get a handle on costs, a corporatewide integrated messaging strategy is critical.

The problem has arisen because companies have begun decentralizing computing power at the same time that they are recognizing the importance of interdepartmental communication. Departments and even workgroups have greater latitude to choose their own technology platforms, and fax machines have become a commodity purchase. Voice mail is less problematic because any high-grade private branch exchange (PBX) system generally includes the capability to control costs. But in some companies telex remains a concern, as organizations attempt to manage this waning technology until it can be replaced by newer, more efficient messaging media.

In terms of rising costs, fax is probably the major culprit. Today, any employee can walk into an office-supply store and buy a fax machine. Plug in that machine, and you immediately begin to incur additional telecommunications costs. Multiply that machine by several thousand units across an organization, and watch your telecommunications costs surge by several hundred thousand dollars a year. A 1994 Gallup Poll, sponsored by the facsimile systems business of Pitney Bowes Inc., showed fax transmissions making up 36 percent of telephone bills of Fortune 500 companies; in addition, 65 percent of the 400 telcommunications managers polled had no policies to reduce fax costs.

In addition, some corporations use outside vendors like AT&T, MCI and Sprint to provide store-and-forward services. That strategy might make sense for intercompany communication. But, frequently in large organizations, employees send faxes to other employees in the same building, which means the company is being charged for a message that goes from the 10th floor to the provider of the service and then bounces back to the 11th floor. Other costly fax practices include sending multiple faxes throughout the day to the same des-

ILLUSTRATION BY JAMIE HOGAN



Chicago White Sox:

THE CIO'S PERSPECTIVE ON MULTIMEDIA

For the second season in a row, IBM touch-screen multimedia kiosks are capturing demographic information about White Sox baseball fans through an exciting interactive video trivia game. This demographic database helps the baseball organization to market special programs to its thousands of fans.

Here's an inside look at how innovative multimedia technology has put the White Sox "up close and personal" with its fans — and how IBM multimedia consultants can put your organization in touch with your customers.

Chicago White Sox:

A Grand-Slam Multimedia D•E•B•U•T

Can you name the Chieago White Sox player who hit an inside-the-park grand slam in 1976 at Royals Stadium in Kansas City?

If you answered "Kevin Bell," you just hit a "home run" in the Whitc Sox Hall of Fame Trivia Contest, which is being played by fans on IBM multimedia kiosks bcfore and during home White Sox bascball games.

Now in their second season of use, these IBM multimedia kiosks are scoring their own "inside-the-park grand slam" at Chicago's Comiskey Park. Fans of all ages are able to test their knowledge of White Sox trivia in a delightful game that's full of exciting graphics, stereo music and full-motion video clips of White Sox highlights. The game is driven by an easy-to-use touch screen that responds instantly to the touch of a fingcr.

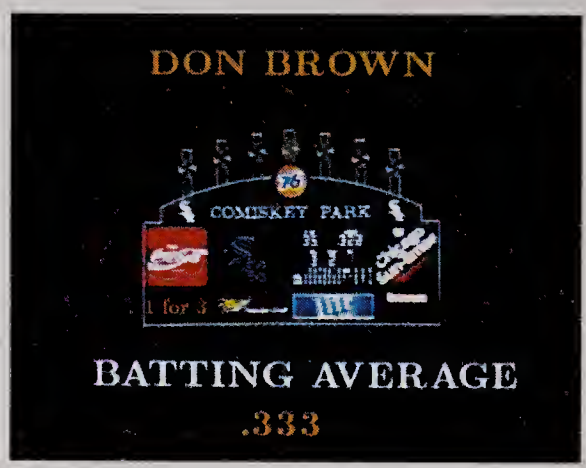
"People are having a blast with the kiosks," says Don Brown, White Sox MIS director and CIO. "They've been a real hit with our fans."

A market research tool

Besides simply entertaining fans, the game is designed to act as a market research tool for the White Sox marketing department. Fans begin the game by entering their name and address on a simulated keyboard displayed on the screen. This information, together with basic demographic information such as age and gender, allows the marketing department to get in touch with White Sox fans through specially targeted programs.

"We wanted to create a tool for the marketing department to determine who our fans are, especially our newer and younger fans," says Brown. "With the kiosks, our fans can entertain themselves and have a chanee to win prizes, while generating a database for our marketing department."

"It's our goal to turn casual fans into diehard fans," says Terry Savarise, vice president of stadium opcrations. "Long-term success is measured by the amount of repeat business you generate, and these kiosks are one way we are trying to generate repeat business. For one thing, the kiosks are fun — they're yet another way we're trying to cntertain our fans. And by generating a mailing list of new fans, we ean create targeted direct mailings to promote merchandise, tieket sales and general White Sox information."



"With the kiosks, our fans can entertain themselves and have a chance to win prizes, while generating a database for our marketing department." — Don Brown

In the 1993 season, the three kiosks captured more than 10,000 names. According to the White Sox organization, the kiosks were *always* in use and usually had a line of three to five people waiting. "We're finding that we're getting a big mailing list," says Savarise, "espeeially of younger fans, who are the ones that we most want to capture and hold onto. They're our future."

How the game works

Before use, the kiosks play an "attract loop" of White Sox game highlights with upbeat stereo music. A fan simply touches the screen to begin, and is then asked to enter name and address information. Enhancing this proeess, the fan hears the sound of a ball and bat hitting at the end of each screen.

After the information screens, the fan is then presented with the image of Comiskey Park's impressive scoreboard — which displays the fan's name "at bat." "People really like the seoreboard with their name on it," says Brown. "They even like to take pictures of it!"

Three trivia questions are asked, and after the fan answers each question, a video clip shows actual White Sox game video footage of either a hit or an out. Answering the first question right results in a base hit. The second question gets a double or triple. And the third question gets a home run. For any incorrect answer, the fan gets an out — popping up or grounding out, for example. Since dozens of

video clips are stored in the kiosk, each clip is fresh. For the fan, the effect is like stepping into a White Sox uniform and playing with the pros.

"The game is nifty," says Brown. "I've seen groups of people cheering each other on. They really got into it."

Savarise agrees. "Judging from the lines in front of the kiosks, the fans are obviously being entertained," he says. "It's not uncommon to see several people in line to use the kiosks. They all start watching the trivia game in progress, and it becomes a group activity that's a lot of fun."

At the end of each ball game, the fan information is downloaded onto diskette and added to the database. Several trivia game winners, selected at random via computer, are announced on the scoreboard at the next game — and receive free White Sox game tickets in the mail.

"IBM stepped forward as real "kiosk people" — they offered a one-stop solution for technology and application development." — Don Brown (right) with IBM rep Fred Brodie (left) and scoreboard manager Jeff Szynal.

Total IBM solution

In developing the kiosk game, the White Sox looked to IBM for a total hardware and software solution. The team was already familiar with IBM's highly popular multimedia exhibit at the Baseball Hall of Fame in Cooperstown, N.Y. Given the success of that exhibit and IBM's reputation for leading-edge multimedia projects, the team felt confident in IBM's ability to deliver a complete solution.

Development was conducted by the local IBM Chicago branch office, which houses one of IBM's regional multimedia consulting groups (see sidebar). Led by Dawn Condotti and Fred Brodie, this group developed the complete kiosk application in only a few months, working closely with both Brown and his associate Jeff Szynal, the White Sox manager of scoreboard operations and TV production.

"IBM has been great," says Savarise. "They were able to deliver the prototype application on a very early deadline, and they were ready with the full application on opening day. And when we've needed service, IBM has been very responsive."

For hardware, the team relied on IBM's Ultimedia® Touch Activity Center family of integrated multimedia kiosks. These durable kiosks are available in several basic models with a range of special options. They are also all ADA- (Americans with Disabilities Act) and UL-approved.

The IBM kiosks sport a number of advantages, including the ease of single-vendor integration and service, and also the flexibility of changing kiosk configurations in the future. Standard options such as credit card readers, printers and phones can be added at any time, allowing the kiosk to adapt to new requirements.

"I wanted something flexible — so that in the future, we could use it to sell merchandise or tickets, or solicit fan club members," says Savarise.

One of the key options that the White Sox selected for its kiosks was IBM digital full-motion video, delivered via an IBM ActionMedia II adapter solution inside the kiosk's IBM PS/2® computer. These ActionMedia II adapters enable the kiosks to display full-motion video clips — with the realism and clarity of videotape — directly from the PS/2's hard drive. Together with stereo sound and colorful graphics, the video clips make the trivia game a delightfully engaging experience.

"I've been in the computer industry for over 30 years, so it takes a lot to get me excited," says Brown. "Let me tell you, the multimedia technology in these IBM kiosks *is* exciting. We went all the way, with full-motion video, graphics, stereo sound, touch screen — the works. But the whole setup is very durable in IBM's kiosk. It really holds up well."

"The marketing wave of the future"

According to Savarise, the White Sox kiosks are part of a new trend in marketing — one that directly involves customers in an interactive experience.

"These interactive kiosks are really the marketing wave of the future," he says. "From the very start, people feel that they are part of the action. It's not just a machine talking to them; it really is interactive, and that's a strong attraction for people."

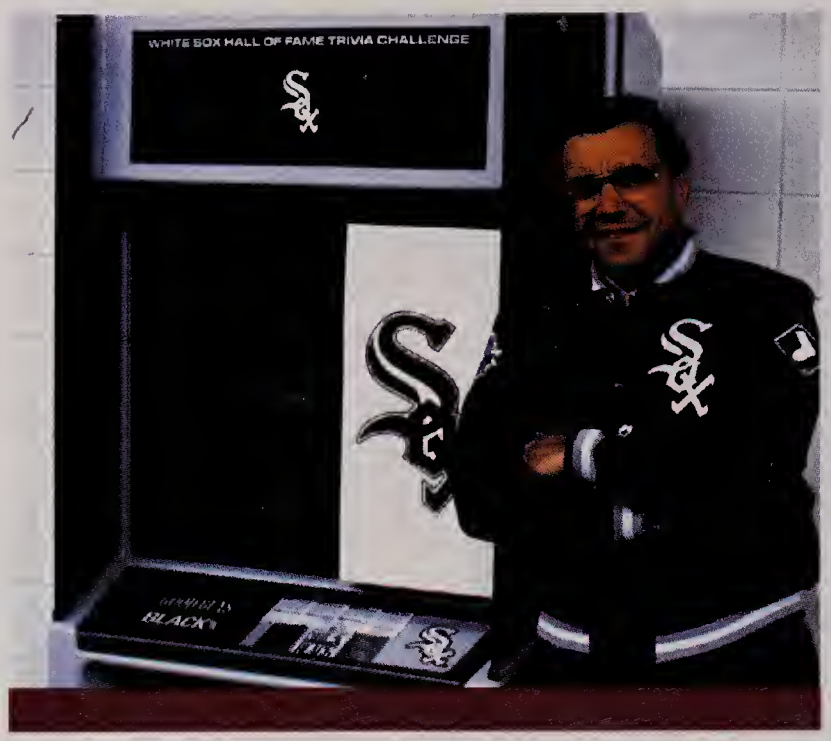
For the White Sox, the first phase of their kiosk project involves fan entertainment and basic market research activities. For the next step, plans are now being made to install IBM kiosks in the new United Center basketball and hockey arena due to open in August 1994. Since the Bulls and the White Sox are both owned by Jerry Reinsdorf, the opportunity for cross-promotional kiosks is attractive and easily feasible.

Over time, the teams may roll out kiosks to other locations — including sports bars and shopping malls. This rollout may involve expanding kiosk services to include the sale of merchandise and tickets. By incorporating an add-on credit card reader, the IBM kiosks can be instantly upgraded to become "self-service stores." In a sense, they'd be like ATM cash machines — except these cash machines would be *taking* the money.

"I envision in the future a fan being able to walk up with a credit card and order merchandise and tickets right at the kiosk," says Savarise. "The tickets could be printed by the kiosk, or mailed with the merchandise directly to the home. Even gifts could be ordered at the kiosk and be shipped directly to the recipient.

"I keep challenging our staff to find new ways to use the kiosks," continues Savarise. "The key is to keep the attraction fresh. In the end, we are bounded only by the limits of our imagination as to what these machines will be able to do."

For more information or to reach the individuals mentioned in this article, call the IBM Multimedia Consulting Center at 1 800 426-9402 and reference ext. 43C.



Talking to the Top

An interview with Don Brown, White Sox MIS Director & CIO

Q You've had IBM multimedia kiosks installed at Comiskey Park for over a year now. How have they worked out?

A It's been a 100-percent success. I don't know what else we would have done differently — except have more kiosks!

Q How many people have used the kiosks?

A In our first season, we got about 10,000 users on only three kiosks. The machines are never idle — there's always a queue at each machine. The fans really get into it. Very often, they make it into a competition with their friends. I see people cheering and actually rattling the machine, like they think it's a pinball machine. From a fan satisfaction and entertainment perspective, it's been a 100-percent success.

Q Why do you think the kiosks are popular?

A People don't see the kiosk as a computer — they think it's a video game. Somebody once asked if it was Nintendo. I saw another guy with a dollar bill, who wanted to know where the slot was to put it in!

The popularity is really amazing. During the league championship series, one of the kiosks went out because of a power problem in the stadium circuit. There was a whole line of people waiting to play, and when I opened up the machine and restarted it, I got a big cheer. The people really wanted to play.

We also found that people wouldn't leave after the ball game, because they wanted to play the machines. In order to clear the park out, we had to start shutting off the machines after the seventh or eighth inning.

Q Do you get long lines for the kiosks?

A It's always three to five people waiting — long enough for everyone to see the screen. If they can't see the screen, they'll come back later. I've been to over 60 games in the last year, and there's always a consistent line. Even if the kids aren't playing, the vendors are playing!

Q Are the kiosks used more by young people than older people?

A The demographics are interesting. Before the games start, more adults play the kiosks, but during the games more younger kids play it. Which is good — those are our new fans. The whole idea is to draw new fans.

We can also now zero in on the women who played, especially those who came to the game for the first time. We run baseball clinics here, and the plan is to target the women who said they came to just a few games. We can market to these women in more of a "bullet" approach than a "shotgun," because we have the names of the women who played.

Q How well has the touch screen worked for users?

A We wanted something that could withstand the abuse of fans pounding on it. Keyboards won't work in this environment, but a durable touch-screen kiosk is ideal.

The touch screen is so sensitive that you really just have to touch it very quickly with your finger. It will go as fast as you can touch it. If you can touch it at 100 words a minute, it will record at that speed. So you don't have to wait — there's no delay.

What's nice with these IBM kiosks is that they are adaptable for several other applications. If we want to sell merchandise, for example, we can easily install credit card readers into the kiosks.

Q How reliable have the kiosks been?

A The machines have stayed up 99.9 percent of the time. They've held up very well. We were going into virgin territory, because the kiosks are supposed to work in a prime temperature range of between 55 and 75 degrees (Fahrenheit). And we had those machines outside when it was in the 30s and probably down to the 20s with wind chill. We also had them out in the summer when the sun was beating down on them at 95

and 98 degrees. We had some 50 and 60 mph wind and even some rain on them — which was an accident, because we generally cover them during rain. We also had fans using them with a beer or ice cream in their hands. They never failed because of weather or fan use.

There are a lot of top-notch things that IBM has put into the kiosks. All the IBM hardware is UL-rated. Somebody could walk by with a radio and not get interference. Or they could play the game while standing in a puddle. We don't want people frying themselves when it rains, or when they're standing in a puddle, or when someone drops a drink on it. So the UL rating and the power sensitivity features are very important.

Q Why did you choose IBM as your kiosk solution vendor?

A Some companies offer pieces of kiosk and multimedia technology, but not many jump out at you as offering a total solution. IBM stepped forward as real 'kiosk people' — they offered a one-stop solution for technology and application development. We were particularly interested in IBM because they had already created the Major League Baseball multimedia exhibit.

Q Has the project lived up to your expectations?

A It's been a great success story as far as we are concerned.

Q How can multimedia kiosks benefit other organizations?

A Multimedia is a 1990s innovation that is now cost-justified. It's a way to integrate computers and video and use these technologies together to interact with people. Some people are selling tickets with it, some people are selling merchandise. Some are using it as an information board. And it's a great way to advertise.

I think the next stage will be voice-activated control. I really think that'll be the breakthrough.

Fans, Customers, Constituents . . .

Zoom INSIDE THE DEMOGRAPHICS With IBM FanTracker

Interactive multimedia kiosk games have the potential to become the hottest trend in marketing — and not just for sports teams. Any organization that wants to get to know its customers and constituents better can benefit from this highly innovative marketing concept. Just think: you can entertain the people you serve while simultaneously learning *who* they are, *where* they live, and *how* you can serve them better!

The multimedia kiosk application pioneered by the Chicago White Sox is now available to other customers as IBM FanTracker™. FanTracker combines a basic software "shell" with IBM multimedia consulting and creative services, in order to tailor a unique solution to each customer's requirements.

"Any organization that attracts thousands of people a year would be a candidate to look at this," says Fred Brodie, IBM project leader for FanTracker. "It could be a sports team, race track, amusement park, casino, university, museum or even a government agency. If the organization wants to develop a relationship with its constituency, FanTracker is a great tool to use. You are giving people a reason to provide information to your organization, in a fun and entertaining way."

IBM consulting and creative services

IBM offered the White Sox complete project management, application development and hardware integration. As a result, the team was able to obtain a total single-vendor solution, which minimizes complexity for both development and follow-on service. The IBM services were offered by a special IBM Multimedia Group based in Chicago, which also developed FanTracker for a national rollout.

"The perception out there is that IBM is primarily focused on hardware," says Brodie. "Many people don't realize that IBM is also one of the largest consulting and services organizations in the world. We have a lot of unique skills that people just aren't aware of. In fact, few companies have the needed depth and breadth that IBM brings to implement difficult or complex projects.

"For a kiosk project, for example, you might need application development, unique kiosk design, networking expertise, creative graphic design and long-term maintenance support. You could probably go out in the marketplace and piece all that together with multiple different vendors, but most people prefer dealing with one person whom they can turn to in order to obtain a one-stop total solution. People like to be able to point one finger and say, 'I want to work with you. And you make all this stuff work for me.' That's a role that IBM plays well."

For more information about IBM FanTracker, call the IBM Multimedia Consulting Center at 1 800 426-9402 and reference ext. 43C.

IBM Multimedia Consulting and Creative Services:

Team Up with IBM Multimedia Consulting

IBM Multimedia Consulting and Creative Services combines business and technical skills for a winning multimedia team

Multimedia is about more than fan entertainment. It's about effective communications. That's a need that nearly every organization faces today.

But to get a revolutionary improvement in *your* organization's communications takes more than just great multimedia technology. It takes a rare combination of business acumen, technical savvy, creative flair and a proven methodology to achieve success. In short, it takes the unique skills of a proven *multimedia consultant*, who has the unique blend of business and technical skills needed to ensure a successful solution.

Business executives often ask IBM, "How can multimedia help my business?" and "How can I get started?" In response, IBM has distilled its decade-plus years of multimedia expertise and created the IBM Multimedia Consulting Practice — which not only possesses skilled, experienced consultants, but also a proven methodology for achieving customer success.

The IBM Multimedia Consulting Practice is a member of the IBM Consulting Group. It meets the IBM Consulting Group's strict guidelines for offering qualified and valuable consulting expertise to its customers. The practice focuses on the application of multimedia technologies into existing or new business functions including the areas of public information, merchandising, training and business presentations/communications.

The Multimedia Consulting Practice provides insight into an important competitive advantage: the use of multimedia technology as a strategic business tool. Recommendations stemming from this process focus on the best solutions for the client's needs; any technology recommendations, including hardware and software, are vendor-independent.

For more information, contact the IBM Multimedia Consulting Practice, 4111 Northside Parkway, Atlanta, GA 30327, 1 800 426-9402, Ext. C10.

IBM Multimedia Creative Services

The IBM Multimedia Creative Services group is a full-service application development organization that combines creative flair and technical elegance. The group has a wealth of experience in video production and direction, graphic design and marketing, plus years of multimedia programming and authoring experience.

One of the unique attributes of the group is the melding of the "boutique agency" creativity with the depth and breadth of IBM multimedia technology experience. This is achieved by having creative directors, graphic designers and video and audio producers working side by side with technical architects.

The technical architect determines the right combination of hardware and software to best satisfy the client's needs. Through access to the vast IBM technical knowledge base — including desktop, mobile, networking, midrange computer, mainframe, and even speech recognition and touch-screen technologies — these architects can select the most appropriate and cost-effective delivery system for a given application.

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Co-Author,
Reengineering the Corporation, vice president,
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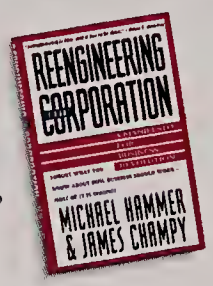

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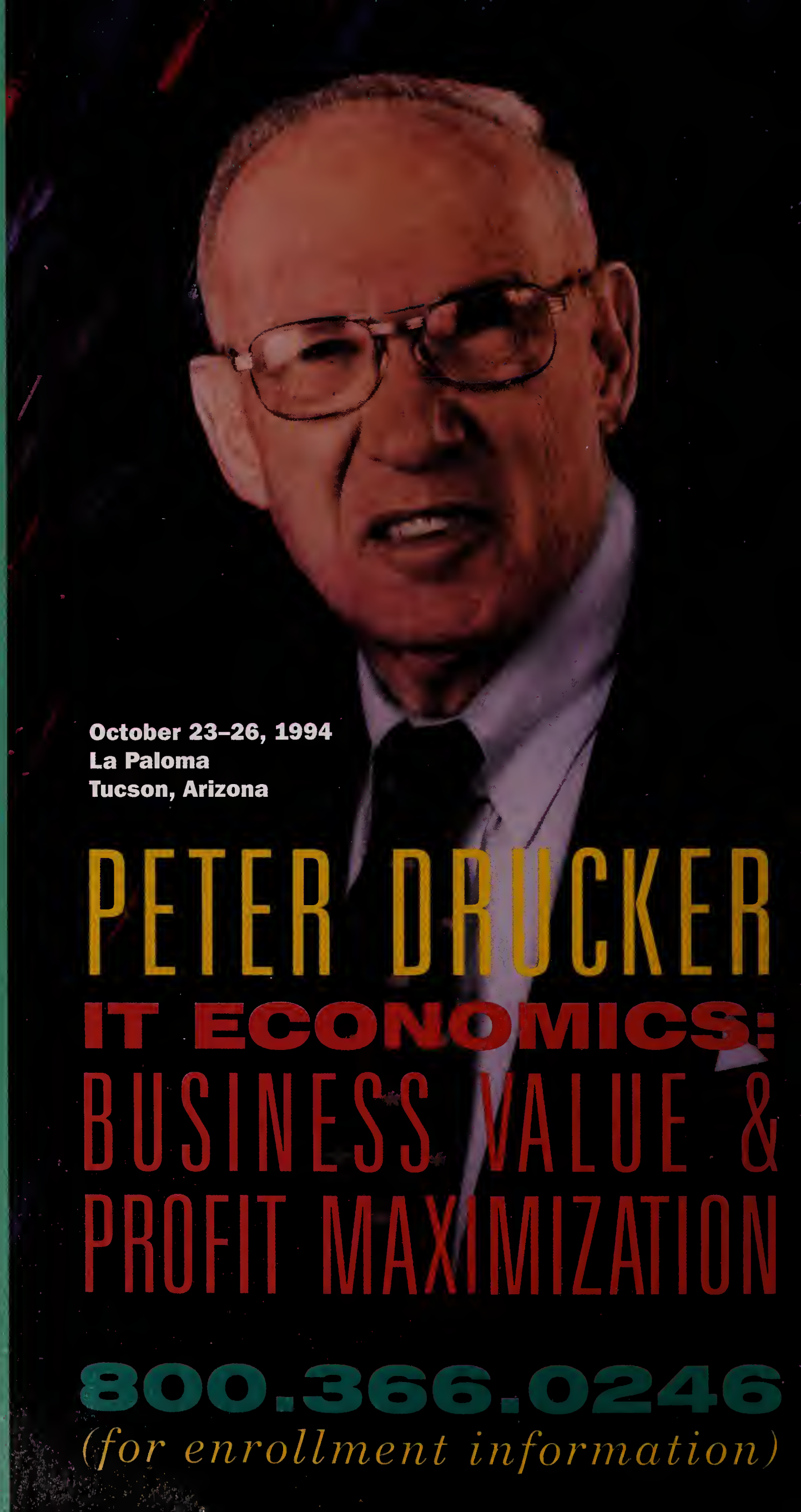

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tination without taking advantage of cost-saving features such as batch messaging, deferred delivery and least-cost routing. Such practices are especially costly when faxing overseas, yet they go virtually unmonitored in corporate America.

Part of the problem is that in most major corporations, faxing hasn't really found a home. Is it a telecommunications tool, something that falls under the purview of the telecom manager? Is it a messaging tool and, therefore, the responsibility of the CIO? Or does it fall in the domain of the vice president of administration or purchasing who bought the machines in the first place? With no true accountability established, fax machines continue to proliferate, and the incremental telephone charges continue to add up.

E-mail presents different problems, largely involving interconnectivity. The trend toward decentralization of computing power means that different departments have control of their own IT budgets, giving them the luxury to select their own hardware and software platforms. As a result, the purchasing department may end up running something on an IBM Corp. platform while accounting is running something else on a Digital Equipment Corp. platform.

In addition to the problem of getting different mainframe applications to talk to one another, increasingly these applications must exist side by side with LAN-based packages. Even individual workgroups may decide to acquire such applications for themselves; that works fine for intragroup communications but makes sharing data with the rest of the organization time-consuming and cumbersome. Messages transmitted among disparate systems are frequently garbled or lost, a situation that can have critical business implications.

Telex presents corporations with the problem of dealing with an older message medium that is largely on the way out but is still used in countries outside the United States and is even critical in some financial-services organizations in this country. Until companies can eliminate telex entirely, the challenge is to manage it and minimize its costs.

Faced with mounting pressure to save money and improve employee communications while minimizing disruptions to existing operations, CIOs need to devise an integrated messaging strategy that will leverage their companies' older technologies while allowing them to take advantage of superior, more sophisticated products as they come on the market. The goal is to enable multiprotocol, multivendor connectivity while at the same time creating an audit trail so that the IS department can track and control the organization's messaging costs.

The goal is to enable multiprotocol, multivendor connectivity while at the same time creating an audit trail.

The first step must be a thorough assessment of the company's messaging needs. How much intra- and interorganizational communications occur? Which departments communicate the most, and how are they doing it? Can any departments reasonably remain in isolation?

Next, an inventory of existing systems will reveal what's out there, what's working efficiently and what's not. The temptation at this point may be to purge and standardize. But since there will always be legacy systems that are impossible to eliminate, the more realistic goal is to determine if it is possible for a mainframe, say, to operate as a centralized hub or whether there are areas where an infrequently used E-mail system can be downsized.

Once the inventory is done, the CIO must determine the requirements for a centralized messaging infrastructure. The system should provide a message switch or hub that insulates E-mail users from protocol and format translations so that the user of Lotus Development Corp.'s cc:Mail or Da Vinci Systems Corp.'s Da Vinci Mail can communicate swiftly and seamlessly with a user of Digital's All-In-One, for example. Users should be able to press a key and send messages that can be read by anyone, anywhere in the company. Not only should all the company's systems be able to communicate, but users should also be able to receive a message in one medium—E-mail, for example—make changes or amendments and then resend it in another format—such as fax or telex. (Fax to E-mail is the most difficult conversion because it involves optical character recognition software, which has not yet been perfected.)

The system should also include an audit trail, which might provide such accounting statistics as the number of pages or bytes transmitted or the duration of messaging sessions. This gives CIOs the ability not only to track their corporations' messaging costs but also to charge those costs back to the user departments. The system should also have the capability to capture messages in a store-and-forward mode that allows them to be sent when transmission rates are at their lowest. And the system should allow for the sending of batch messages to avoid making multiple connections throughout the day. (According to the Pitney Bowes/Gallup survey, only 5 percent of Fortune 500 companies make an effort to send faxes during cost-efficient hours.)

Any messaging strategy should also take account of an organization's electronic dealings with external organizations, whose systems may also be incorporated in order to facilitate EDI and similar processes. This means the IS executive should consult with principal suppliers and customers before implementing a solution.

For an investment of roughly $250,000, corporations may experience savings of as much as $300,000 to $500,000 a year after the initial payback. Such bottom-line improvements—together with the increased productivity—is plenty of reason for CIOs to start getting—and getting out—the message. CIO

Ron Banaszek is president of Incotel Inc., a message-integration company headquartered in New York.

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PURSUING THE PERFECT PITCH

Reengineering is making its way through the organization and out to the front lines. Sales and marketing will never be the same.

BY MEGAN SANTOSUS

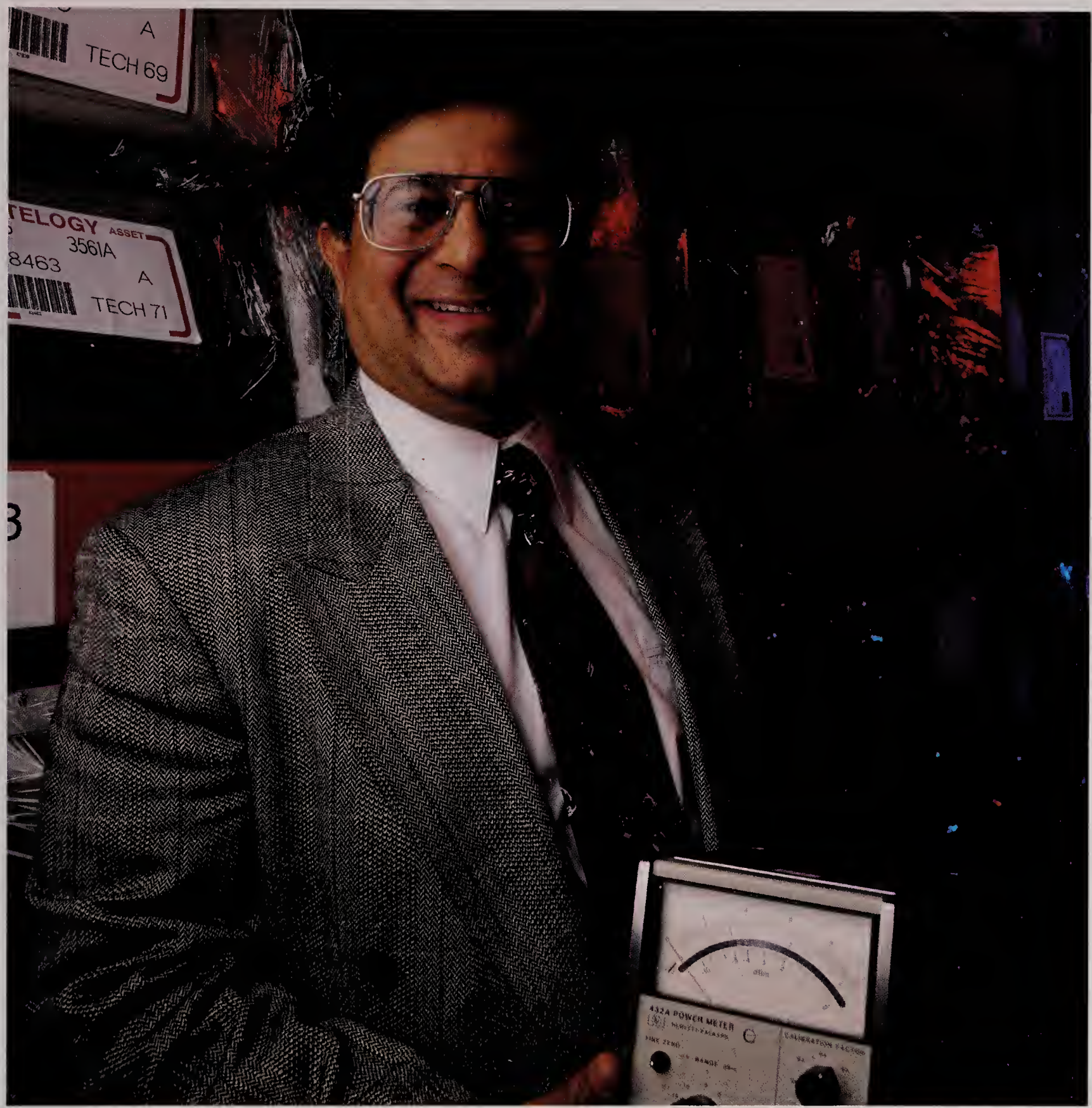
WHEN IT COMES TO REENGINEERING and improving business processes, sales and marketing have missed out on most of the action. True, a lot of sales forces are now more efficient, thanks to portable computers, spreadsheets, and word-processing and contact-management software. But mere sales automation is not enough—not when competition is cutthroat and customer loyalty is fleeting. Companies will derive a sustainable competitive advantage only when automation is harnessed to create processes that put the customer—and not the sales representative—first.

"What we should be talking about is sales *augmentation*," says B. Joseph Pine II, president of Strategic Horizons Inc., a consulting firm based in Ridgefield, Conn. "Instead of automating the tasks of salespeople, organizations should concentrate on giving them the tools to augment their skills and abilities, and to better understand products and relate to customers."

It's the latter two tasks that are getting a lot more complicated. For example, many organizations are slashing inventories at the same time they are offering more products—and introducing them faster than ever before. To satisfy legions of exacting customers, some companies are turning to mass-customization—manufacturing unique, made-to-order products by the thousands. Keeping up with the volume of products while giving customers the heightened level of service that they expect requires quick access to accurate information and seamless communications, often among multiple departments. In this kind of environment, reengineering sales and marketing processes becomes critical to building a competitive organization.

Technology can help salespeople be more proactive and responsive to existing and prospective customers. By adopting a customer-focused approach, sales and marketing can provide the kind of value-added service that can spell the difference between landing an account or losing out to a competitor. Especially in industries where products are commodities, customer service is often the only factor that separates a market leader from a laggard.

Of course, understanding sales processes is essential to reengineering or improving them, and this is where many organizations run into problems. Unlike other functions, such as accounting, there are no standard



SATEESH LELE: *"We can take an order at 5 p.m. and guarantee delivery by 10 a.m. the next day."*

PHOTO BY GREGORY MILLER: DPP/SF

sales and marketing practices. The way that leads are generated, prospects tracked, proposals prepared, orders filled and deals closed varies from company to company.

"Every sales department has its own fingerprint, and any system has to be responsive to the needs of the people who are going to use it," says George W. Colombo, president of Influence Technologies, a sales-automation consulting firm in Merrimack, N.H. "This is one of the main reasons why sales is late in coming to reengineering." It's also a reason why many sales-automation projects have not lived up to expectations. Technology implemented for the benefit of management—often to "supervise" field sales forces—usually brings more resistance than gains, Colombo says.

Another obstacle to reengineering is attitude. Many organizations still cling to the idea that sales will increase along with the number of leads, cold calls, proposals or other such traditional metrics of sales activity. If this were the case, reengineering sales processes might make little sense.

Paul Selden, president of the Sales Automation Association, a nonprofit group in Dearborn, Mich., has a different notion. He believes that the quality and reengineering concepts used for manufacturing should be applied to sales and marketing processes as well. Before total quality management (TQM),

"The TQM movement hasn't reached sales yet, and that's where we need to go."

–Paul Selden

manufacturing was a numbers game. A company with a defect rate of 50 percent, for example, would produce 2,000 parts when it needed 1,000.

That mentality is still prevalent in sales and marketing, where the quantity of leads or proposals is considered over their quality, according to Selden. "The TQM movement hasn't reached sales yet," he explains, "and that's where we need to go." Once sales and marketing directors begin thinking in terms of improving the quality of leads, cutting the cycle time for closing a deal and reducing the reject rate of proposals, reengineering sales processes will eventually gain widespread acceptance.

A few companies are not waiting for that to happen. They have already discovered that reengineering sales and marketing processes can be very good for business. Changing how sales and marketing personnel do their jobs, relate to customers and communicate with other members of the organization gives these companies the competitive edge that they are seeking.

Telogy: *Accommodating Business Change*

A company that has recently experienced annual growth rates in the double digits might seem like an improbable candidate for enterprisewide reengineering, yet that's exactly what's happening at Telogy Inc. The Redwood Shores, Calif., company—which leases, rents and refurbishes electronics-testing and -measuring equipment—wants to go beyond relying on its own large inventory and instead leverage the installed base of equipment worldwide. "There's about $40 billion worth of equipment out there," explains Sateesh Lele, Telogy's senior vice president and CIO. "We're trying to create a

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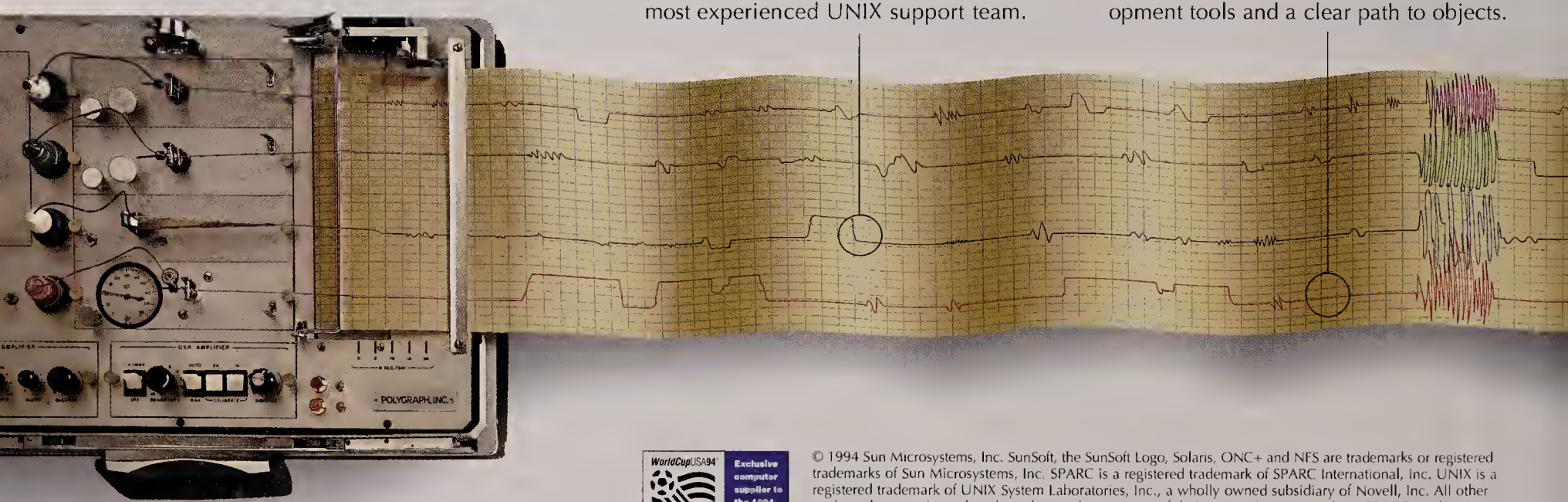

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worldwide market of matching companies that have equipment with those that need it."

To implement this strategy, business processes had to be overhauled, and the company began its reengineering effort with the sales department. "Sales was tackled first," Lele says, "because it provided the biggest bang for the smallest buck." The goal was to increase customer responsiveness by providing each salesperson with all of the information necessary to handle every step of the sales process, from identifying and tracking leads to preparing price quotes and filling orders. "Being able to deliver equipment faster and provide one-stop shopping is the way we'll gain market share over our competitors," Lele says.

Previously, Telogy's sales department was divided into three distinct areas: An outside sales group called on customers and established relationships with high-potential prospects; inside sales provided customers who called in with configuration information; telesales qualified leads and tracked low-potential prospects. Since the sales systems in place were not integrated, information could not be shared among the three areas electronically. Invariably, bottlenecks developed as processes in the sales cycle were handed off. To get a price quote for a customer, for example, an outside rep would call an inside rep, who would call the customer with the information. Many reps spent half their time gathering and rekeying data. Sales opportunities were occasionally missed because equipment was no longer available by the time an order was processed.

"The ability to slice and dice information has changed the way our salespeople work. They function more as a team focused on the customer."

–Sateesh Lele

To improve coordination among the salespeople, Telogy implemented a client/server-based architecture that centralizes customer,

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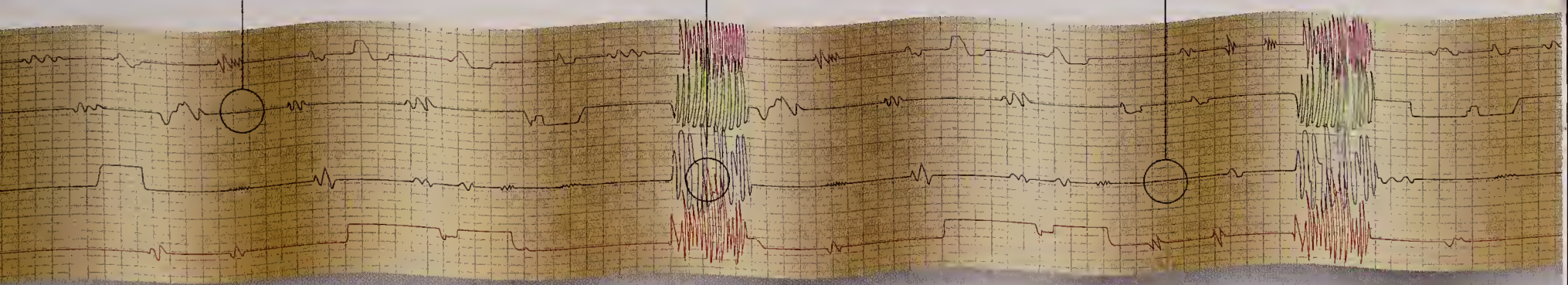

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inventory, pricing and manufacturing information in a Sybase Inc. relational database. Desktop applications from Aurum Software Inc., of Santa Clara, Calif., provide each salesperson with access to the same accurate information. Customer-contact information is recorded in shared files, giving every salesperson the ability to manage a deal through the entire process, from initial contact to final sale. "We can now process an order in record time," Lele says. "We can take an order at 5 p.m. and guarantee delivery of the equipment by 10 a.m. the next day."

JOHN WILLIAMS: *"The system allows salespeople to offer a business solution to a business problem. They are now consultants rather than salespeople pushing hardware."*

The result is increased productivity and profits, according to Bill Lewis, vice president of sales and marketing at Telogy. "The system has changed the way people relate to each other and communicate with the customers," he says. "Salespeople spend more time talking to more customers, do less paperwork and devote more time to selling." Telemarketing and direct-mail campaigns are also more effective because customer information can be quickly organized and sorted.

"The ability to slice and dice information has changed the way our salespeople work," Lele says. "They function more as a team focused on the customer" and, therefore, better understand customer profiles. He and others are confident that the reengineered sales processes will support Telogy through future business changes.

Storage Technology:

Adapting To Growth

In 1990, business was good for Storage Technology Corp. After a few lean years, the Louisville, Colo., manufacturer of storage and retrieval devices for large computer systems had just surpassed $1 billion in annual revenues and was getting ready to launch 14 major new products. Such an aggressive growth plan, however, put the spotlight on the antiquated systems and processes that were used by the 2,500-member field sales force.

"The sales force was doing a marvelous job," says John Williams, corporate senior vice president of the Americas business unit. "But we were concerned about how we could efficiently sell the new products given our distribution process." In particular, configuring and pricing the new, complicated products would have taxed salespeople to the limit: The company's products sell for more than $100,000 and have a total of 5,000 options, all of which have to be configured correctly.

The product launch became the catalyst for a sales-force quality-improvement effort. With 10 years' experience in sales automation and mobile computing at GRiD Systems Corp., Williams knew that sales-force automation required more than laptops, spread-

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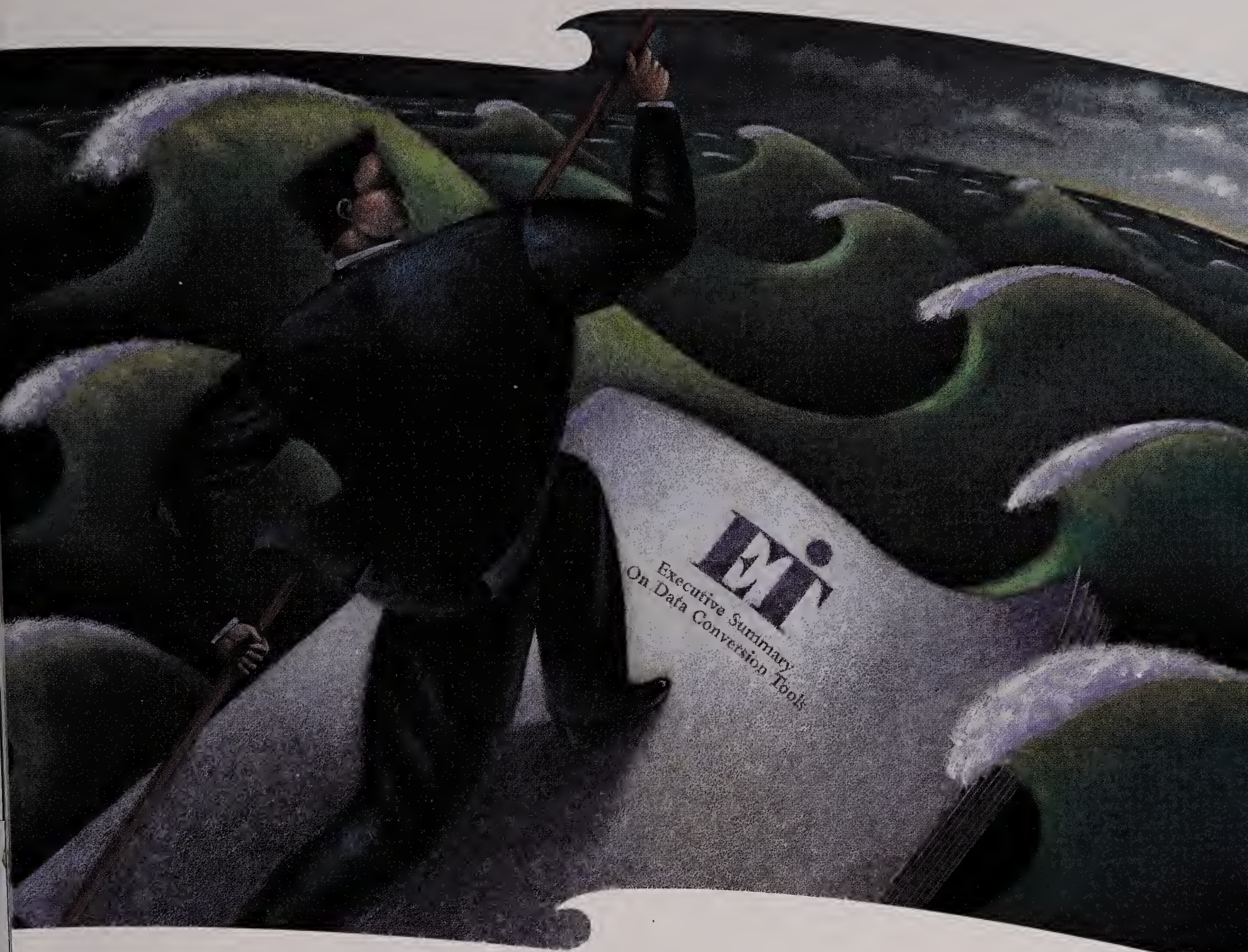

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sheets and word-processing software. A review of the field operations revealed that salespeople spent the majority of their time performing administrative tasks and less than one-third of their time selling. "We wanted to break the bureaucratic yoke that was around their necks," Williams explains.

"We were giving the salespeople a tool that would make them more productive. They needed to use it without the fear of thinking management was checking up on them." *–John Williams*

Forty-four processes that could benefit from automation were identified and then grouped into three broad areas. The improvement project, which Williams dubbed Apollo, concentrated on applications that would improve the efficiency of salespeople, make them more effective and enable communications among the far-flung field offices and headquarters.

With help from Apple Computer Inc. and Andersen Consulting, a fully integrated sales-automation tool was rolled out to 300 senior sales reps in November 1991. The first release featured Apple PowerBooks loaded with E-mail, spreadsheet, word-processing, proposal-generation, and product-pricing and -configuration applications. To ease adoption of the system among the salespeople, Williams kept management out of the project for the first six months. "We were giving the salespeople a tool that would make them more productive," he explains. "They needed to use it without the fear of thinking management was checking up on them." This approach, combined with an easy-to-use interface, led to Apollo's quick acceptance.

The impact of the system on productivity was just as quick. At the end of the first year, salespeople were spending 45 percent of their time selling. Thanks to the online product-configuration capabilities, a proposal can be prepared in less than an hour while a sales rep is with a customer. Previously, it took an average of 10 days to ready a proposal because pricing and configuration information had to be checked and approved by a succession of managers. A typical sales cycle, which used to take nine months and 50 calls, has been reduced by 25 percent.

Williams believes that the biggest impact of Apollo has been cultural. "The quick dissemination of information is remarkable compared with three years ago," he says. "A new product feature can be announced immediately to everyone for very little cost." In particular, the seamless communications capabilities of the system have enabled the company's far-flung employees to work more collaboratively. Through an icon-driven bulletin board that has key-word search capabilities, sales reps can get the latest marketing information immediately instead of having someone else track it down. The bulletin board also enables sales reps to share ideas, a practice that is encouraged by a $1,000 reward for the best suggestions.

By freeing salespeople from much of the paperwork that used to keep them away from customers, Apollo has changed the nature of the sales job. "The system allows salespeople to offer a business solution to a business problem," Williams says. "They are now consultants rather than salespeople pushing hardware."

Investors Group: *Responding to Competition*

Paper has an insidious way of piling up and squelching the productivity of even the most talented salespeople. At Investors Group Inc., Canada's leading financial-services and investment firm, many of the most experienced salespeople find themselves in a Catch-22 situation: The more they sell, the less time they have for selling. "Because we're still very much paper-based in handling our client business, the reps who have been with us for five to 10 years are spending more of their time on administrative and trouble-shooting tasks rather than prospecting and selling," says Robert Murdoch, the manager of fund marketing and sales software at the firm's headquarters in Winnipeg, Manitoba. That's one reason Murdoch is heading up a sales-process-reengineering project that will rely on automation to drive change throughout the company.

Automation is not new at Investors Group. Since 1984, salespeople have used a suite of stand alone projection tools to customize product proposals for clients. While the tools are useful, they have not changed how salespeople work or how products are sold. Faced with increasing competition, Investors needs to reduce the costs of winning new clients and maintaining existing accounts. Increasing the number of clients that sales reps can effectively handle without compromising service is where Investors hopes process reengineering and automation will pay off, according to Murdoch.

"Some of our representatives come in on Sunday just to go through the mail and catch up on their paperwork. If we can eliminate these mundane, administrative tasks, they will enjoy their work more."

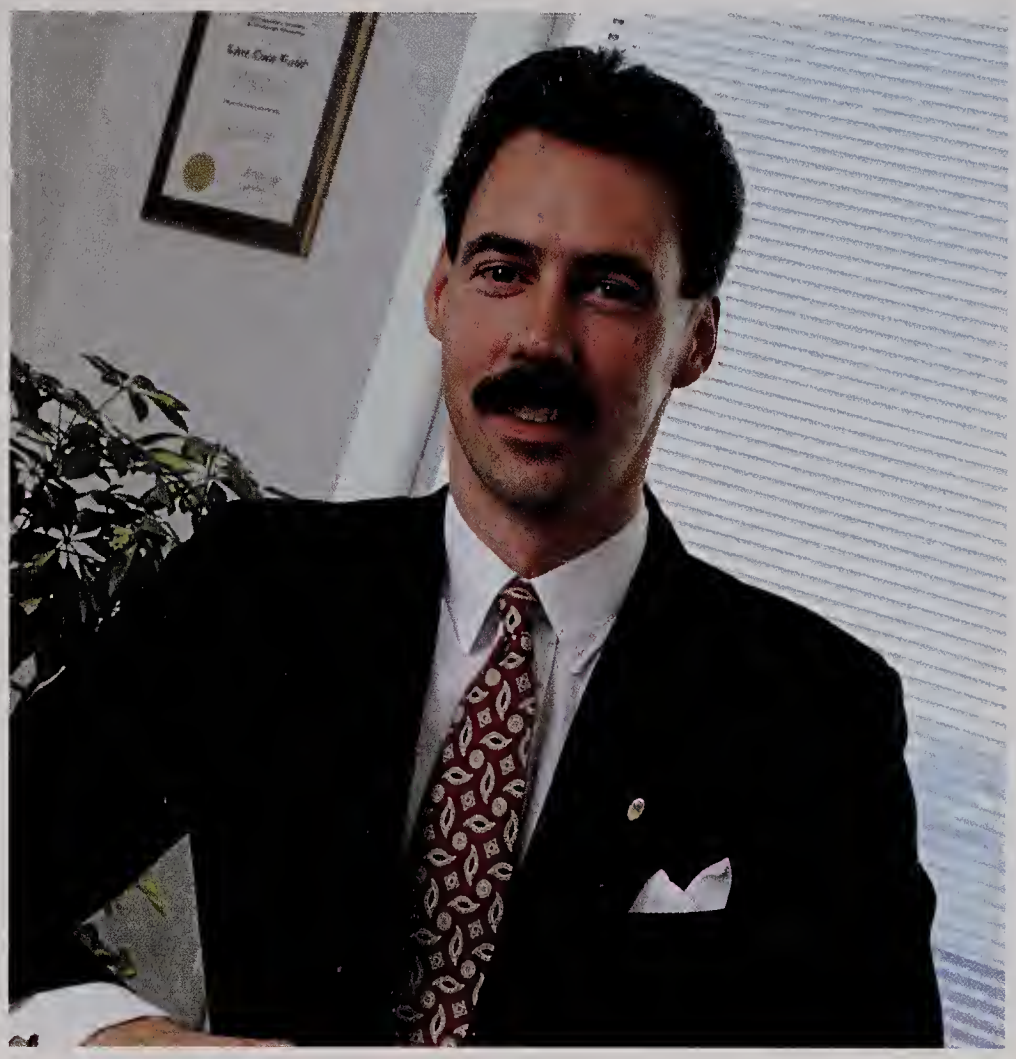
–Robert Murdoch

In 1992, Investors devised a vision of how it wants its sales force to operate in the future. The vision, which will be carried out in a five-year business plan, will bring changes throughout the company. "We want to maximize the time salespeople spend on qualifying and selling and improve the level of customer service," says Murdoch.

Laptops loaded with everything a sales rep will need to conduct business at a client's home will be rolled out to the 3,100 salespeople working nationwide. Applications are being developed concurrently and will be deployed to about 500 reps at a time. Given the size of the project, Murdoch believes that introducing everything to everyone at the same time would prove unmanageable. "We're looking at the entire sales cycle—from order entry through administrative follow-up and service tasks—and removing redundant processes," he explains.

Investors will have to do quite a bit of process removal. When a customer wants to open up the Canadian equivalent of a 401(k) plan, for example, an application form currently travels through a total of 56 steps at three geographic locations. Since salespeople are already gathering the data necessary to open an account at the point of sale, new, streamlined processes enabled by automation are expected to drastically change the jobs of support staffers who work at the 85 regional offices.

"We expect to free them from some of the clerical tasks they now do," Murdoch says. "They can become marketing assistants by organizing seminars and getting more involved in client-relations activities and direct-mail campaigns. Sales managers will also be relieved of many administrative functions, so they can concentrate on training new representatives.



ROBERT MURDOCH: *"We want to maximize the time salespeople spend on qualifying and selling and improve the level of customer service."*

As the chief sponsor for the project, Murdoch has had to gain the support of salespeople. He accomplished this by conducting a pilot study that demonstrated how automation alleviated many of the administrative tasks that now occupy so much of their time.

"Improving the quality of life for our sales force is definitely one of the benefits that we're looking for," Murdoch reports. "Some of our representatives come in on Sunday just to go through the mail and catch up on their paperwork. If we can eliminate these mundane, administrative tasks, they will enjoy their work more." And that, he believes, will help Investors Group retain talented people. CIO

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TAKING ON THE WORLD

It's one thing to operate internationally, but becoming a truly global organization is something else altogether. Emerging markets promise great rewards for companies that do it right, but the journey is rarely easy. Same goes for the CIO—going global offers a world of opportunities, but there are a multitude of new issues to consider. In this special report, *CIO* looks at what it really means to learn the ways of the world....

ILLUSTRATION BY MARK FISHER

BECOMING A WORLD POWER

"This is the year of globalization. If you're not globalizing, you're out," says Ernst & Young's Gabriel Rozman. Shifting to a global focus can improve a company's competitiveness in myriad ways, and IS plays a key role in making it happen.

PAGE 40

UNITING NATIONS

How do you maintain cohesiveness in a global organization that's dispersed throughout the world? A robust technology infrastructure, including a strong backbone network and standards for just about everything, is critical.

PAGE 55

WORLD TRAVELERS

"Sensitivity and patience are key to success in bringing a company together to compete globally," says Arthur D. Little's Tobey Choate. CIOs must adopt a new way of thinking—and help their staffs do the same.

PAGE 67

BECOMING A WORLD POWER

The environmentalists' dictum to think globally and act locally is taking a new twist in business circles. Thinking *and* acting globally is the order of the day in many corporations, both in the United States and overseas. "This is the year of globalization. If you're not globalizing, you're out," says New York-based Gabriel Rozman, international management consulting coordinator at Ernst & Young.

The ingredients are all there now to allow even small companies to have a global reach. Trade barriers are coming down; telephone service is ubiquitous and, in most places, reliable. Facsimile transmission and electronic mail make written communication almost instantaneous, and broadband communications permit virtual face-to-face conversations, as well as the swapping of engineering drawings and other complex documents. "Marketing today requires being able to compete with everyone globally," Rozman adds. "You're no longer restricted to your local market."

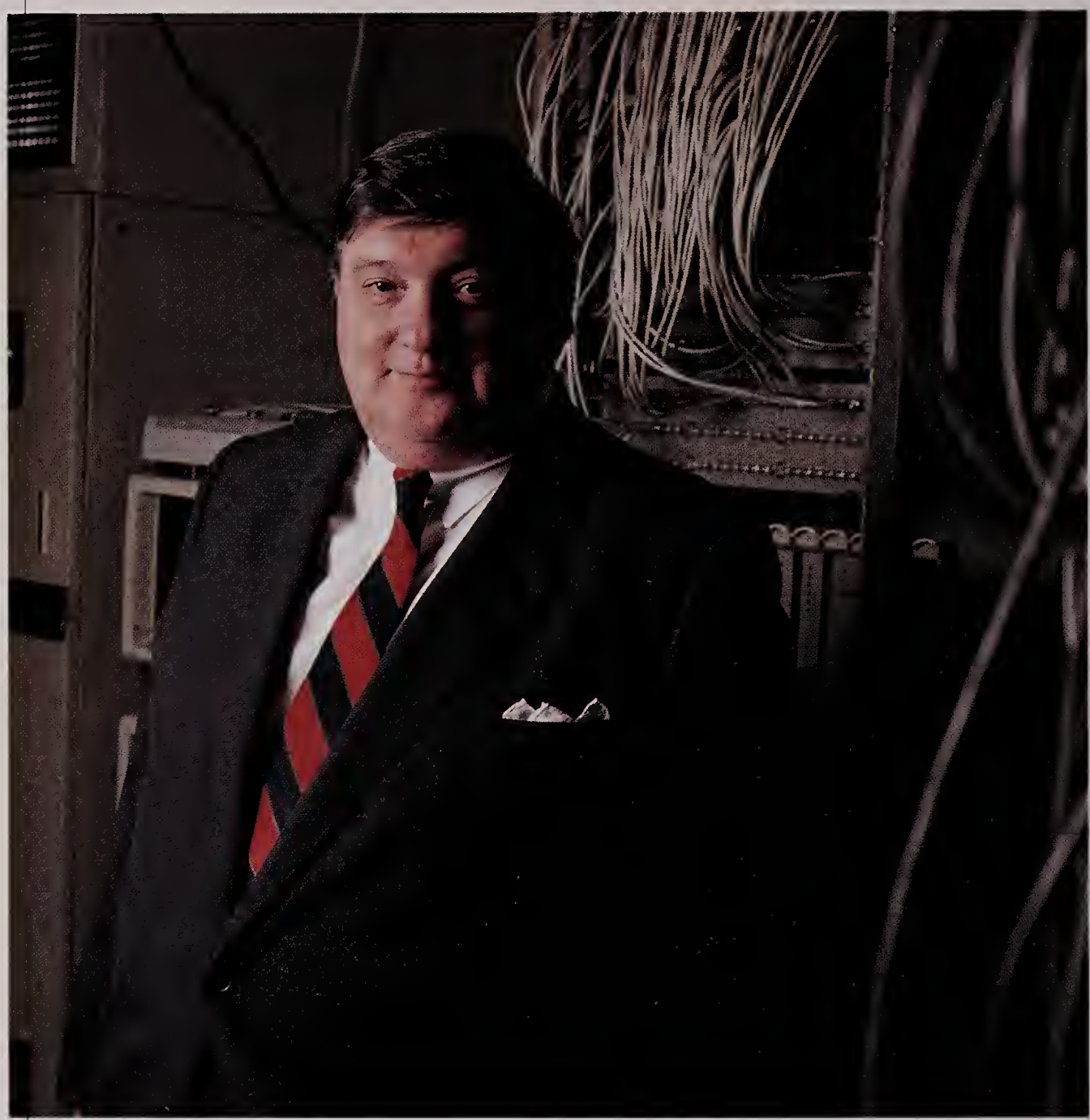
As new markets open up and improved communications put them in reach, global opportunities abound for U.S. firms. Making the most of them depends, to a large extent, on IS.

As the obstacles to global trade diminish, the opportunities increase. "There are incredible emerging markets out there. People have to start taking advantage of that fact," says Jack Reich, president of multinational accounts at MCI Telecommunications Corp. in Chicago. (Reich has since left the company.) He ticks off a list of emerging markets. "India, China, Latin America,

BY MICKEY WILLIAMSON

PHOTO BY KENT HANSON

WILLIAM SCHIMOLER:
Chase Manhattan's Opus application passes control of a crucial function around the globe each day.



ROBERT E. McNULTY: *Digital's global network allows the company "to distribute technology and not people."*

Mexico—there's going to be an investment explosion in those particular pockets to take advantage of the consumer markets there. Think of the opportunity for issuing credit cards in China. There's no way you can expect wide usage of credit cards without the fundamental infrastructure to accommodate it."

Most companies today do business internationally, but few have stepped up to the challenge of real globalization, according to Alan C. Stanford, national director of information technology consulting in Ernst & Young's Chicago office. "They don't operate globally in that they do not coordinate between their units. They certainly don't align their business processes, and corporate IT usually follows a hands-off policy for non-U.S. operations." At international companies, Stanford says, "country leaders tend to select their own computer strategies. They may meet [with IS executives from other countries] for information exchange, but they don't manage as a unit."

"TO US, THE NETWORK IS BORDERLESS.... We don't care what country the network is in. We don't care what time of day it is. Where we are managing the network is completely transparent to our users."

–ROBERT E. MCNULTY

A major difference between international and global operations is this: In the international organization, most foreign sites either house only the portions of functions such as sales and marketing that concentrate on that country, or they may operate as independent business units that occasionally report their results to the central office but otherwise have little or nothing to do with headquarters. By contrast, the global enterprise locates functions based on economic advantage such as labor costs or regulatory considerations such as duties and tariffs. "Now it's more a question of where is the best place to manufacture our product, rather than let's build it here and sell it there," Stanford says.

The first benefits of globalization commonly come from economies of scale and scope. It's fairly easy for a CIO to realize economies of scale, says Tobey Choate, vice president and managing director of information technology at Arthur D. Little in Cambridge, Mass. The obvious early steps include consolidating data centers and reducing the cost of communications.

One company reaping this benefit is computer maker Digital Equipment Corp., based in Maynard, Mass. Digital owns what it claims is the world's largest private network, with 103,000 nodes located in 100 countries. Management of the network "follows the sun," says Robert E. McNulty, Digital's vice president and CIO. With network operating centers in Littleton, Mass., Valbonne, France (near

PHOTO BY BILL O'CONNELL

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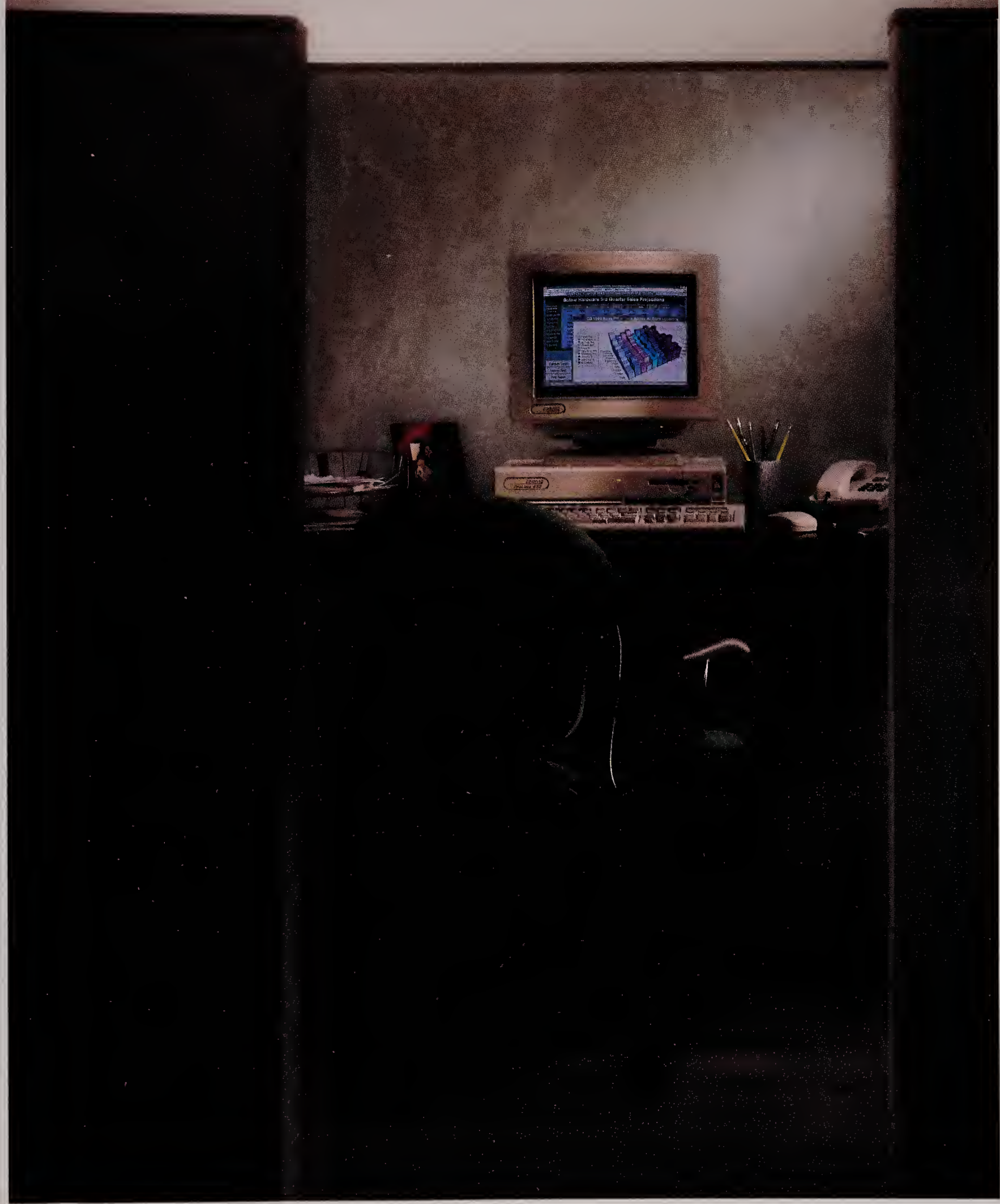

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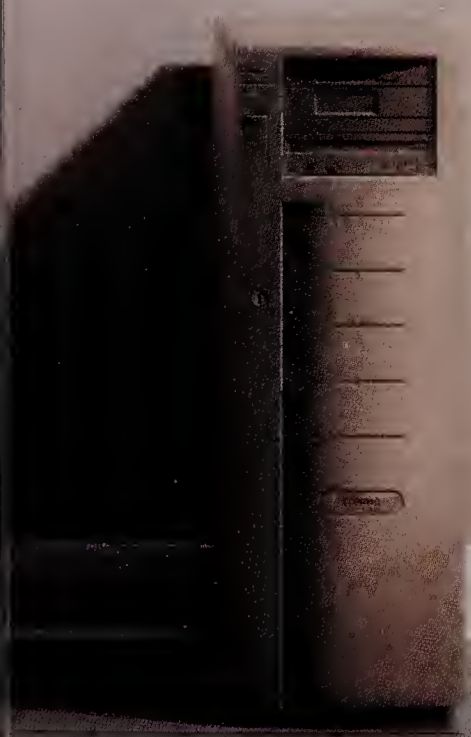

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Nice), and Singapore, management responsibilities are handed off at the end of each eight-hour shift, seven days a week. "To us, the network is borderless," he says. "By having these remote sites, we don't care what country the network is in. We don't care what time of day it is. Where we are managing the network is completely transparent to our users."

Digital runs 160 data centers for both internal and external customers on this network. These data centers are clustered geographically, with one in each cluster being designated as the lead data center. The others are run "dim or dark. In a dim data center you may take out all of the people who would mount tapes and do things like that, but we may still keep a supervisor on-site. Then we back down to a totally dark center, with no one there," McNulty explains. In Digital's European operations, the IT consolidation is estimated to have reduced total IT costs by between 25 and 30 percent, McNulty says.

Soon the company will roll out a global logistics system that will run unattended. "We plan to put it on an Alpha [computer] in a closet that no one goes into," he says.

McNulty says the huge network allows him to "distribute technology and not people." Digital's application developers, who used to be assigned to functional areas such as finance and manufacturing, are being transferred into a single global development entity, which will be run as a line of business. But rather than moving developers and their families to another community, transferring them in this global organization means simply changing their budget codes. For Digital, this arrangement provides the ability to assemble whatever resources are needed for a particular project, regardless of their location around the world, without the delay and expense involved in relocating them.

MOST OFTEN, companies that do business worldwide handle financial rollups with technology from the early 1980s: Business analysts key reports from national offices into spreadsheets.

KEN HARRIS: *"Our business starts where we interact with customers."*

PHOTO BY SONNY WILLIAMS

Not every application need be a global application, experts say. Money is money the world around, but the rules under which it is calculated, exchanged, accounted for and reported on change from one locality to the next. Global software applications must handle all of these mutations and more.

Companies are better off when they don't globalize some applications, says Gary Gagliardi, president of FourGen Software Inc., of Seattle.

Accounting and payroll systems, for example, are best left to local developers and maintainers. Countries such as France impose a statutory chart of accounts, and each nation has its own laws about taxation. Further, every country has its own version of the U.S. Internal Revenue Service's reporting forms 1099, W-2, W-4 and so forth. Therefore, it makes no sense to globalize government-reporting applications, Gagliardi says.

JERI BENDER: *Increased European trade makes sharing information vital.*

Still, global companies need to know how they're doing, and that means there must be some way to collect each locality's financial results and ultimately roll them up into one aggregate report to stakeholders and another to government agencies in the headquarters country. Regional and national sales and profitability comparisons are also a must for the global enterprise, and that means translating all countries' currencies into the one used in the headquarters country.

Most often, companies that do business worldwide handle these financial rollups with technology from the early 1980s: Business analysts key reports from national offices into spreadsheets. But that route is fraught with danger, Gagliardi warns. "Once you put accounting information into a spreadsheet, you've lost any auditability," he says.

Gagliardi tells of one company that converted its manual consolidation system to one that accounts automatically for currency differences. In the process, management discovered that corporate assets had been misstated "by a factor that could have affected their stock price, had they not figured a way to hide it."

At the Louisville, Ky., global headquarters of KFC, the world's largest chicken restaurateur, Ken Harris is overseeing the implementation of systems that will make financial consolidations easy and auditable. Harris, vice president of worldwide systems, heeded requests from financial and marketing management to provide a shared database of accounting and management information that could measure performance in all markets on a consistent basis. KFC's choice of a FourGen software package, he says, "allows us to transact in one currency and roll up in another."

Government regulations are not the only consideration in deciding whether to globalize an application. The handling of financial transactions also differs from place to place, with heavy cultural penalties attached to ignoring this fact. "In Europe, checks are seldom—I would almost say never—used," Gagliardi reports. Everything is done by bank transfer. Companies fill out a bank-transfer form to pay each vendor and employee. The form goes to the bank, and the bank transfers the required amount into the recipient's account. In many places, interbank transfers can cost as much as $20 for each payment, so companies often maintain cash accounts in each bank patronized by those to whom they make payments.

To accommodate local differences in custom and law, some companies are sorting their application portfolios according to their applicability on a local, regional or global basis and then gaining economies of scale by rewriting those that can be used globally. Jeri Bender, manager of CASE and methodology for Vevey, Switzerland-based Nestec Ltd., the

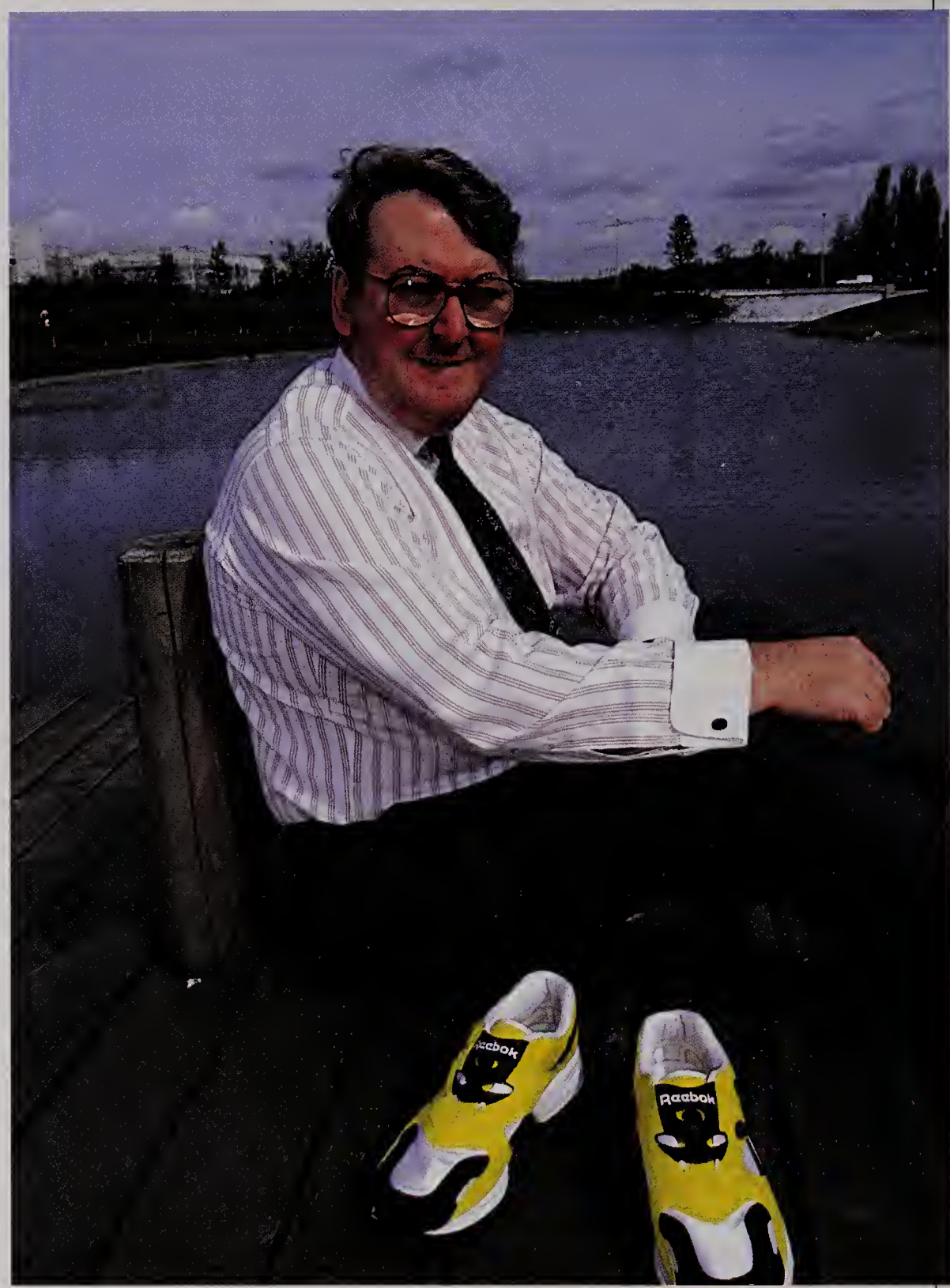
PHOTO BY WILLY SPILLER © LIAISON INTERNATIONAL

global IT operations of Nestle Holdings, is part of a mammoth effort to bring core business applications under a global umbrella.

Nestle has been an international organization for generations, growing mainly in recent years by acquiring companies such as Perrier, purveyor of bottled waters. "We are such a large corporation of many autonomous companies that senior management decided we were spending a tremendous amount of money reinventing the wheel," Bender says. Further, she adds, as trade walls crumble in Europe and elsewhere, "it has become extremely important that we start sharing information. The only way to do that is to get to common systems." Working with business managers in countries as far apart as Spain and Australia, South Africa and the United States, Bender has used Ernst & Young's Navigator methodology to describe Nestle's business processes and information systems architecture.

TO ACCOMMODATE local differences in custom and law, some companies are sorting their application portfolios according to their applicability on a local, regional or global basis and then gaining economies of scale by rewriting those that can be used globally.

Now she and her colleagues are linking that information to a repository in packaged client/server software from SAP AG of Waldorf, Germany. Eventually, the global Nestle organization will use the same tools to accomplish the same processes.



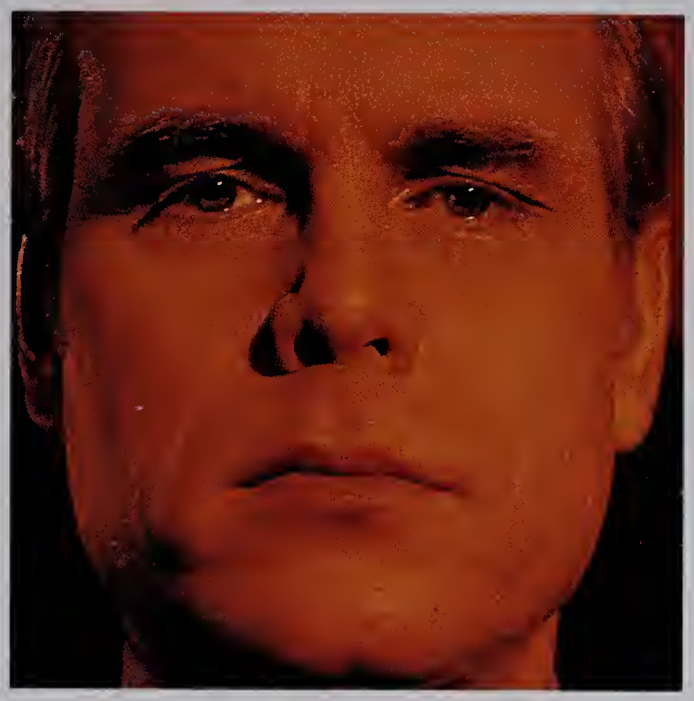
TOM TRAINER: *Reebok is looking at globalizing product development as a way to achieve economies of scale while still accommodating local markets.*

PHOTO BY PETER JORDAN © LIAISON INTERNATIONAL

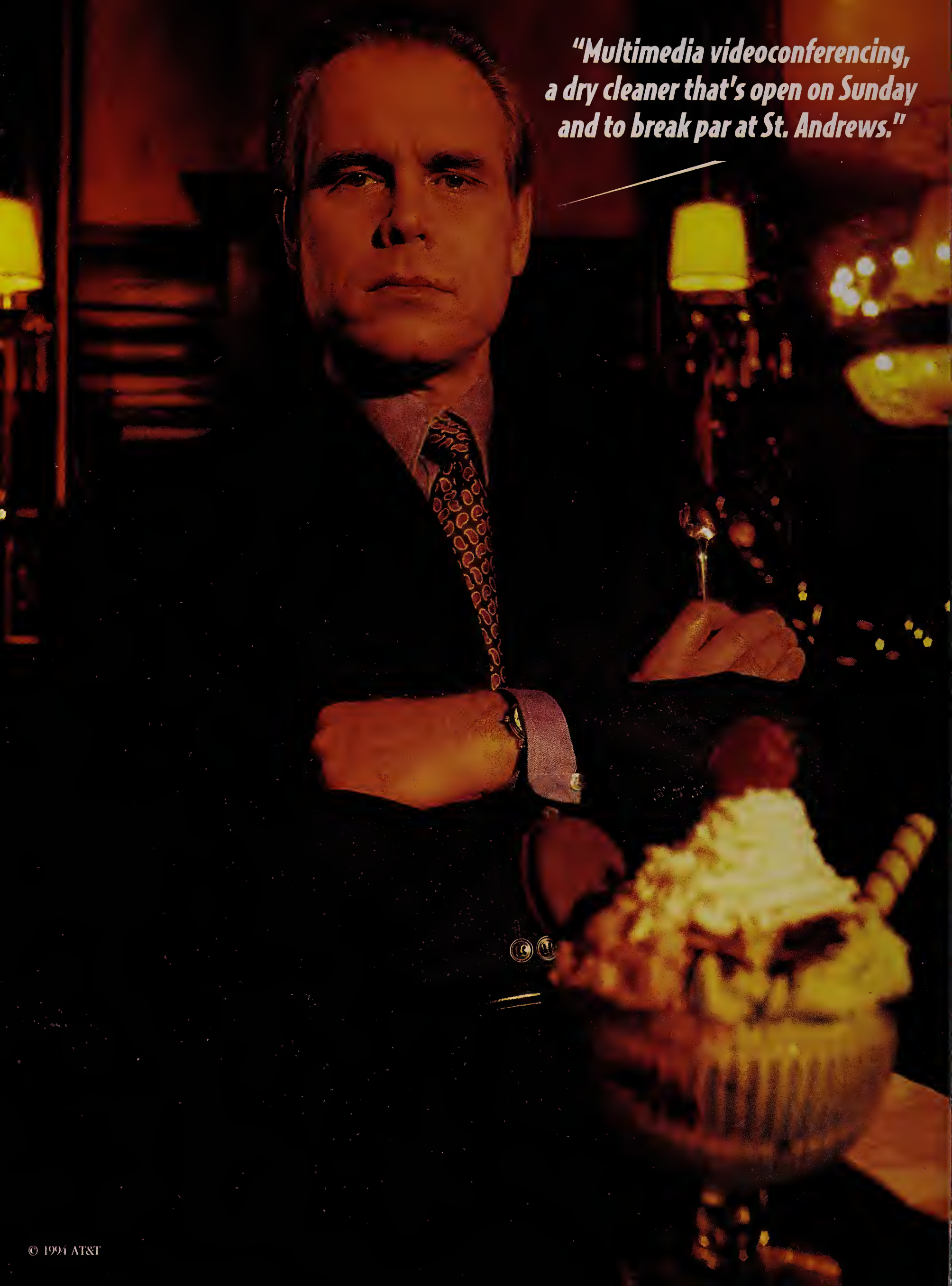
Among the benefits: consistency both in results and in the support required, and economies of scale in purchasing those tools.

Economies of scope are more difficult to achieve, but they have a greater impact, says Arthur D. Little's Choate. Opportunities for economies of scope are uncovered by looking at processes normally performed on a regional basis and considering how they may be applied for broader impact across the globe, he explains. One of the stars in the expanding-scope department is Chase Manhattan Bank, which, like Digital, passes control of a crucial business function around the world each day.

Chase runs a global application called Opus that manages investment-rate risk for investors and currency traders. At any moment, for every person who thinks that interest rates in a particular currency are going to rise, there is another one who thinks they are going to fall, says William Schimoler, vice president of trading technologies in Chase Manhattan's New York headquarters.



WHAT DO YOUR TOUGHEST CUSTOMERS WANT, EXACTLY?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a dry cleaner that's open on Sunday
and to break par at St. Andrews."

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Network Systems

Opus links currency bulls and bears, each of whom pays the bank a fee for protection against unforeseen rate movements. Matching and trading are managed around the clock in New York, London, Milan, Tokyo and Sydney, Australia, Schimoler explains. When one office turns off the lights, the "book" that records transactions and traders' positions in various currencies is passed on electronically to the next Chase Manhattan facility. Chase can truly tell its customers that the company will manage their investments while they sleep.

Chase Manhattan's Opus application depends on a single database that stores transactions as they occur. It is available to currency traders regardless of their location.

Sometimes, though, it makes more sense to keep data closer to the place in which it is generated. KFC marketing people can consult the headquarters database to see how various menu items are doing, but they are more likely to do their analysis on one of the regional databases that the company also supports. "Our business starts where we interact with customers," Harris says. "The marketing department needs to slice and dice information about what customers are ordering, when and why." Each night, regional offices in the United States, Australia, Mexico and Puerto Rico poll all 9,000 KFC outlets in some 60 countries for the day's sales data.

"The business in Australia is different from the business in Mexico or the business in Canada," Harris says. "Local taste preferences tend to be different, and if you're going to succeed in this business, you've got to account for local tastes. The best way to do that is to manage the business very close to the customers."

Purveyors of food are not the only companies that need to stay aware of local differences to stay competitive. At Reebok International Ltd., based in Stoughton, Mass., CIO Tom Trainer says that design and distribution of the company's sports apparel must be tailored to seasonal variations as well as local preferences. Design units are located in major market segments, divided first between the northern and southern hemispheres and further by major population areas. These regional organizations design roughly 70 percent of that market area's products, Trainer says. As the company expands its global network, "we're in the process of taking a look at [product design] as a strategy and determining to what extent a global line incorporating the needs of the local markets might provide some opportunities for economies of scale while accommodating [those] markets," Trainer says.

"THE BUSINESS IN Australia is different from the business in Mexico or the business in Canada. Local taste preferences tend to be different, and if you're going to succeed in this business, you've got to account for local tastes. The best way to do that is to manage the business very close to the customers."

–KEN HARRIS

Globalizing product development is one in a series of steps a company can take to reduce the time involved in bringing new products to market. "The whole idea of time-based computing is well-accepted in most enterprises," says Laurence Walker, vice president of the networks business group at Digital. "Anything that can shorten time to market, time to profit or time to break even is a significant advantage. The use of networks, especially integrated networks, can do that."

At Baxter Health Care Corp., in Deerfield, Ill., whose U.S. division wowed the IS world several years ago with an information system that tracked hospitals' inventories and automatically replenished supplies before they ran out, the focus now is on getting new products to market worldwide in the shortest possible time.

The challenge for Sue Leboza, director of global information systems, is to get people's attention away from the financial, distribution and manufacturing systems that have brought Baxter to its current position in the marketplace and to turn the spotlight to funding research and development for systems that will speed product development.

"This is a big change in focus for us—and a big sell to the management structure," Leboza says. The goal is to speed everything from idea generation to design to the collection of clinical-trial results so that near-simultaneous approval can be obtained from regulators in the more than 80 countries where Baxter does business. To do that, Leboza says, "you're talking about getting a pretty sophisticated telecommunications infrastructure in place."

Tools, applications, databases and the telecommunications network to make them accessible are the focus for companies seeking to globalize what has traditionally been a collection of largely independent national organizations. If that makes the IS organization at world headquarters into operators of an information utility, that's OK with John Shiels, vice president of information systems at J.M. Huber Corp., a diverse manufacturing and natural-resources-management corporation in Edison, N.J. Says Shiels, "If you boil down our mission statement, it's to provide information to authorized users when and where it's required." CIO

Mickey Williamson is a technical journalist based in Warwick, Mass. Her Internet address is qwertygroup@mcimail.com.

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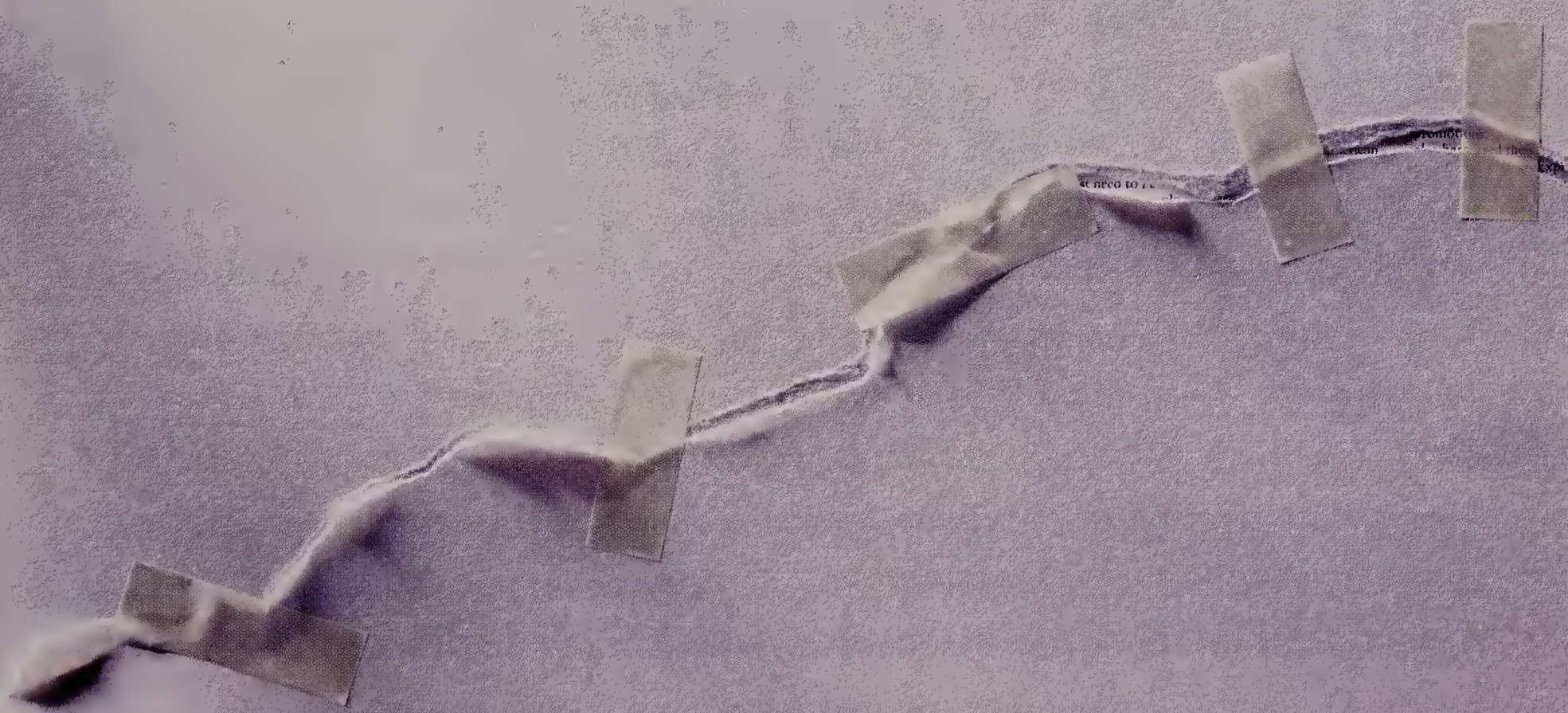

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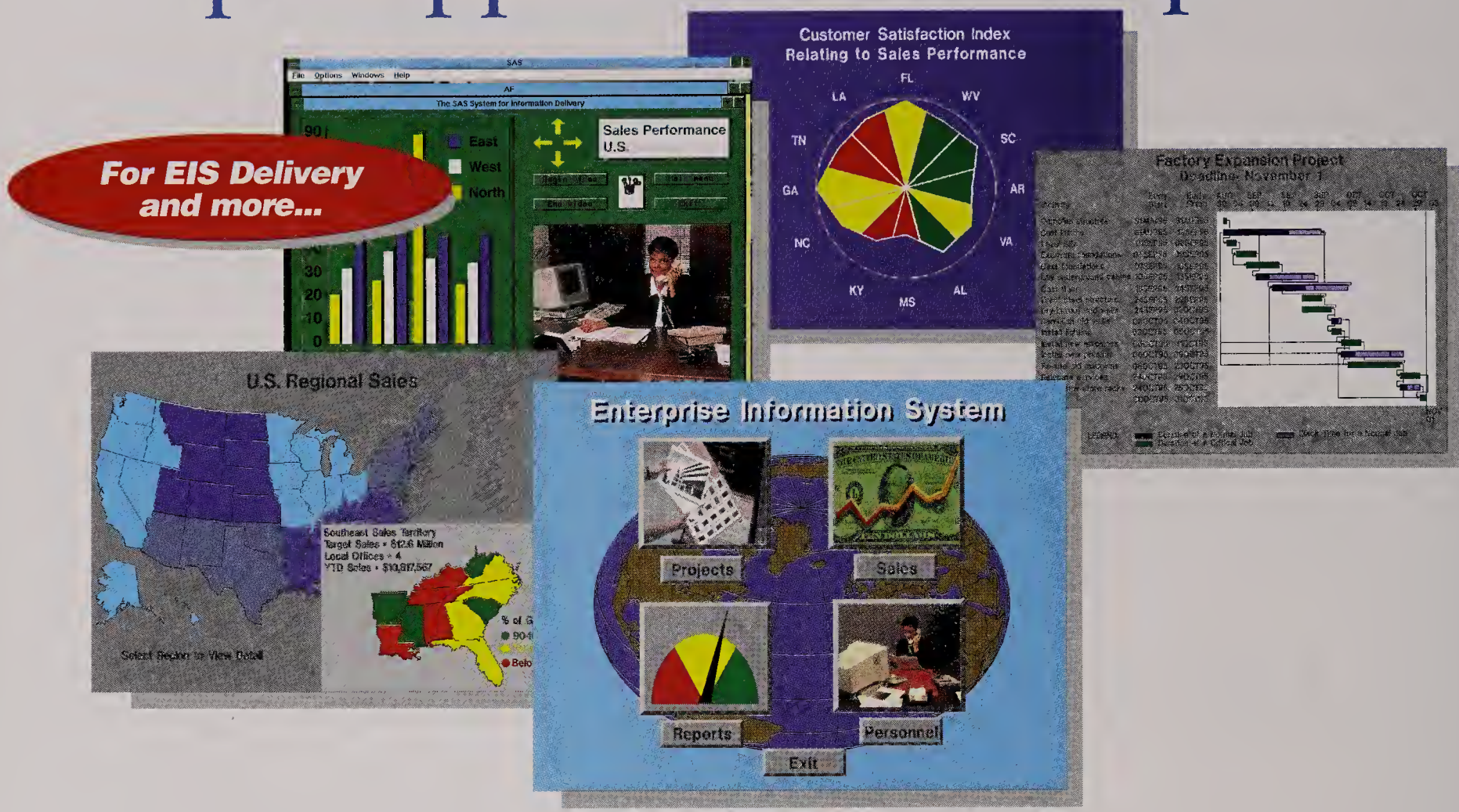

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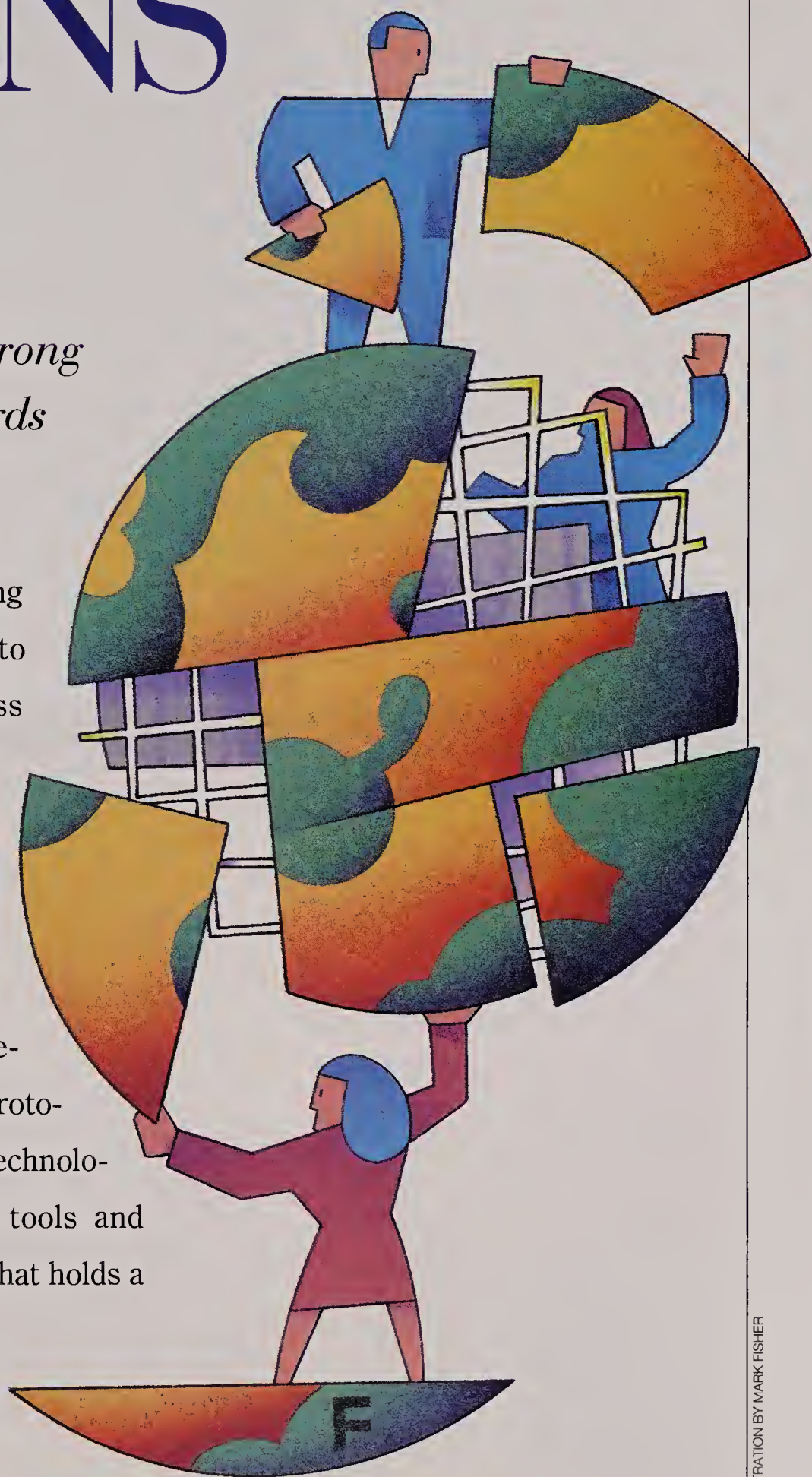
UNITING NATIONS

The robust technology infrastructure required to do business globally includes a strong backbone network and standards for just about everything



If globalization is a means of coordinating among international business units to achieve strategic and business-process alignment as well as economies of scope and scale, infrastructure is what provides the wherewithal. Without a robust backbone network to link its many local and wide area networks, a global enterprise would sag and flop like the spineless scarecrow in *The Wizard of Oz*. Standards and protocols are crucial, too: for communications technologies, business processes, development tools and applications. They are all part of the glue that holds a global corporation together.

BY MICKEY WILLIAMSON

ILLUSTRATION BY MARK FISHER

VIRTUAL PRIVATE networks provide a predetermined amount of capacity that can be dynamically reconfigured, eliminating the inflexibility disadvantage.

Global networks come in all conceivable sizes and shapes (see "Networking's World Beaters," *CIO*, October 1990). As with domestic networks, they may be private or public. On a public network, the information transmitted travels along communication lines owned by one of the common carriers—AT&T or British Telecom, for example—right beside your rehash with a colleague of yesterday's tennis match and your teenager's uneasy conversation about whom to ask to the prom. Common carriers are required by law to take whatever transmission comes along and get it to its destination, without favoritism. If the circuits are busy, you'll have to wait to get a dial tone.

Private networks are all business, more exclusive and, some think, more secure. Companies can lease lines from a common carrier and either provide their own transmission and switching equipment or rent them from the telephone company. With a private network, a company is assured it will always have the capacity it has paid for. For William Schimoler, vice president of trading technologies for Chase Manhattan Bank in New York, "probably the biggest advantage of a private network is security, absolutely knowing who's attached and protecting all the information accordingly."

But private networks are not without their drawbacks, the most significant of which are high cost and lack of flexibility. If a company wants its network to carry more calls at one time or to carry bandwidth-hungry applications involving image or video, it will have to wait until the telephone company from which it leases its lines can provide additional capacity, says Schimoler.

Other communications options exist, as well. Virtual private, software-defined networks provide a predetermined amount of capacity that can be dynamically reconfigured, eliminating the inflexibility disadvantage. The privacy and security they furnish rival those afforded by private networks. And the corporation pays only for the capacity it uses.

Satellite communications, which have a fixed cost regardless of the amount of data transmitted, enable data exchange with many remote locations. Satellite can be used to link sites where public lines are unreliable and leased lines are too expensive. The signals they beam are usually encrypted to provide security. Very small aperture terminals (VSATs), which work with orbiting satellites to create a point-to-multipoint corporate network, have made this an affordable solution for many companies.

Wireless communications, including cellular, packet-radio and spread-spectrum technologies, are often used as nodes to the global network, especially in remote locations where reliable telecom lines don't exist.

Most global organizations use a combination of network technologies. "The public networks offer economy of scale and capability, too," says Robert E. McNulty, who as vice president and CIO at Digital Equipment Corp., headquartered in Maynard, Mass., presides over what

GLOBAL NETWORKS

OPTIONS	BENEFITS	DRAWBACKS
Public Carrier	*Widely available & dependable in most developed countries; low cost*	*Capacity not guaranteed; service in many developing nations still unreliable*
Private Leased Lines	*More secure; predetermined capacity always available*	*Higher cost; fixed capacity*
Virtual Private (Software Defined)	*Capacity is easily adjustable; company only pays for what it uses*	*Can involve delays in expanding capacity*
Satellite	*Fixed cost, regardless of amount of data transmitted; not dependent on terrestrial lines*	*Costly for small applications; while VSATs offer plenty of speed for broadcasts from the home station to remote sites, return transmissions can be slower, and communications among remote sites are slowest of all*

COLOR BY MARK FISHER; ILLUSTRATION BY MICHAEL SIGGINS

his company claims is the world's largest private network. "We use MCI, AT&T, and [third-party] cable and wireless and so forth because they bring to the table things that we can't afford [to build on our own]. I don't think you can use only one technology. You have to mix and match to optimize results."

Ken Harris, vice president of worldwide systems at KFC in Louisville, Ky., concurs. "What you're looking for is the ability to handle the volumes of data that you want to transmit without any delay," he says. "You want maximum availability and the most economical price."

Important as it is, the network is not the only component of an infrastructure that brings laurels (and, no doubt, furrows) to the brow of a global corporation's CIO. Ask any IS chief to describe the corporate information infrastructure, and within the first sentence you'll probably hear some variant on the word "standard."

"We've tried to standardize a number of different aspects of the technology," says Chase Manhattan's Schimoler. "For example, for hardware and operating systems, we've standardized on Sun [Microsystems Inc.] workstations and servers to support the trading businesses. The hardware and operating system in turn use TCP/IP as the network protocol because it is so readily networked."

"We've developed standards for hardware platforms, standards for operating systems, standards for development practices and standards for naming items of data," says Jeri Bender, manager of CASE and methodology for Nestec Ltd., the global IT operations of Nestle Holdings, in Vevey, Switzerland.

"Standards are the way you knit together parts of a business that aren't physically tied together," says Tobey Choate, vice president and managing director of information technology at Arthur D. Little Inc., in Cambridge, Mass.

In the quest for standards, however, it is important to maintain some flexibility. Some IS organizations provide foreign developers and end users with tools to build short-lived applications for themselves. "The businesses do some development within their own units, to analyze a business opportunity that may exist only for a few days," says Schimoler. He explains that it would be impossible to impart to an IS professional that rapidly the financial implications of such an opportunity. "We provide the businesses with tools so that they can very quickly produce [financial] models themselves." Applications developed in this way can in turn be incorporated into the whole. "If one of those models becomes key to the rest of the processing system, then we embed it into one of the larger systems and assume responsibility for it within the systems area," Schimoler says.

> "THIRD-PARTY PROVIDERS BRING TO THE TABLE things that we can't afford to build on our own. I don't think you can use only one technology. You have to mix and match to optimize results."
>
> –ROBERT E. MCNULTY

Application development and support are usually more unified efforts at global companies than at international ones, and much of the IS staff's time is spent on education and support. Nestec is implementing packaged software from SAP AG, in Waldorf, Germany, partly in an effort to save the IS staff for other important work. "We're using our development staff as business analysts, implementers and business-process reengineers," Bender says.

Like others on the IS team, Bender spends most of her time on the road, helping business managers to define processes and the data those processes rely on. Her presence in places as far-flung as Australia, Zimbabwe and the United States (her home base is Switzerland) not only fosters interregional communication

ONE FOR ALL

STANDARDS—*for communications technologies, hardware, development tools, applications and business processes—are the grease that keeps the global wheels turning smoothly. But it's important not to stifle innovative solutions just because they don't fit the existing corporate mold.*

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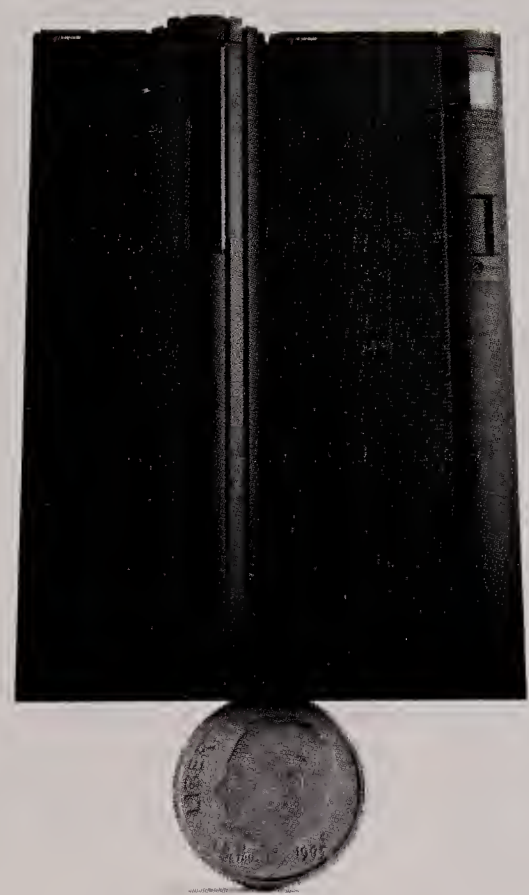

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"WE'RE USING OUR development staff as business analysts, implementers and business-process reengineers."

–JERI BENDER

but also demonstrates to one and all that Nestle is serious about making itself into one global company instead of the huge international operation it has long been.

Providing application support for dispersed marketers is high on the priority list for Tom Trainer, vice president and CIO at Reebok International Ltd., in Stoughton, Mass. Trainer is overseeing the field testing of a new release of Dun & Bradstreet's SmartStream Analyzer software for data analysis so Reebok staff worldwide will have a consistent means of analyzing their market and marketing data.

Reebok uses Lotus Notes, a groupware application, to maintain a global database of the results of athlete endorsements. "We have over 1,000 professional athletes around the world signed up to endorse our products," Trainer explains. "That constitutes a major investment in terms of payments to those people, which needs to be tracked and compared with consumption of products." The legal department is tied into this system to help it standardize endorsement contracts. The Notes database is also available to some of the company's transaction systems for near-real-time reporting on the results of promotional activities around the world.

Notes also enables Reebok designers to work collaboratively while serving their local markets. Reebok designs its products both to global standards and to regional specifications; with Notes, designers can disseminate digitized drawings and textual communications among all of the company's design centers.

Such close communication and collaborative software are musts for global design and marketing efforts, asserts Gabriel Rozman, Ernst & Young's coordinator of international management consulting in New York. "Global groups, working together to design common products, [are] the wave of the future," he says. "Groupware that helps designers change products, parts and subassemblies has certainly promoted globalization in the auto industry."

With collaborators everywhere, the Tower of Babel syndrome may need to be addressed. While support for multiple languages is a complicated problem, it is one that seems to engage only a small amount of CIOs' attention. Allan Deering, vice president of MIS at PepsiCo Inc., of Purchase, N.Y. (the holding company for Pepsi Cola North America, KFC and a raft of other organizations that operate in 150 countries worldwide), says current design techniques make multilanguage systems "far less of a hassle than they used to be. With a flip of a [software] switch, you can go from English to Spanish to French. On the other hand, English is becoming a universal language, so there's less need to translate than there used to be."

When writing multilanguage systems, it's important to have the translations done by natives of the country or region where the system will be used, says KFC's Harris. "Spanish in Mexico is different from Spanish in Spain," he says.

Chris Longstaffe, director and vice president of Esprit Consulting Ltd., an international change-management consultancy in Chesham, England, finds people more receptive when they are addressed in their native language. On one assignment, the consultants were asked to produce a training videotape in English, French, German, Spanish and Italian. "The first time 'round, we dubbed the English version with voices speaking in the other languages," he says. "That works when you have a group of people talking but [not] when you have a single presenter," which creates a much more direct and intimate communication experience. In training videos, Longstaffe explains, "you cannot get away, for example, with having an English speaker telling

IN THE VERNACULAR

LANGUAGE *is a very personal and culturally sensitive issue. But the need to address multiple language requirements in software and other corporate material can raise thorny problems for the IS staff responsible for development. For instance, some languages use a double- or multi-byte character set; others are written from right to left instead of from left to right.*

the Germans how to behave. It was much more successful when we went to each country and reshot the sequences using a local presenter."

But translating software into other languages raises its own problems, according to Gary Gagliardi, president of Seattle-based FourGen Software Inc. Some non-European languages, Chinese and Japanese among them, require extra video support because they use what is known as a double-byte character set. Other languages, such as Thai, use a multi-byte character set. Sometimes it takes 1 byte of information to get the character on-screen; at other times, it may take as much as 3 bytes. Then, too, there are countries, particularly in the Middle East, that write from right to left instead of left to right.

"These problems are very deep and sometimes specific to a single country, and no software package anywhere solves all of them," Gagliardi says.

Corporations can dream all they want about the growing opportunities in the global marketplace, but without support from an infrastructure built and tended by the IS organization, they won't get very far. However, that's not to say that the proper role for a CIO is to push the enterprise into globalization. "The [companies] that seem to get it together most quickly have very strong IT standards and very collaborative IT organizations," says Alan C. Stanford, national director of information technology consulting in Ernst & Young's Chicago office. "They don't necessarily lead, but they're very involved." CIO

Mickey Williamson is a technical journalist based in Warwick, Mass. Her Internet address is qwertygroup@mcimail.com.

"THE COMPANIES that seem to get it together most quickly have very strong IT standards and very collaborative IT organizations."

–ALAN C. STANFORD

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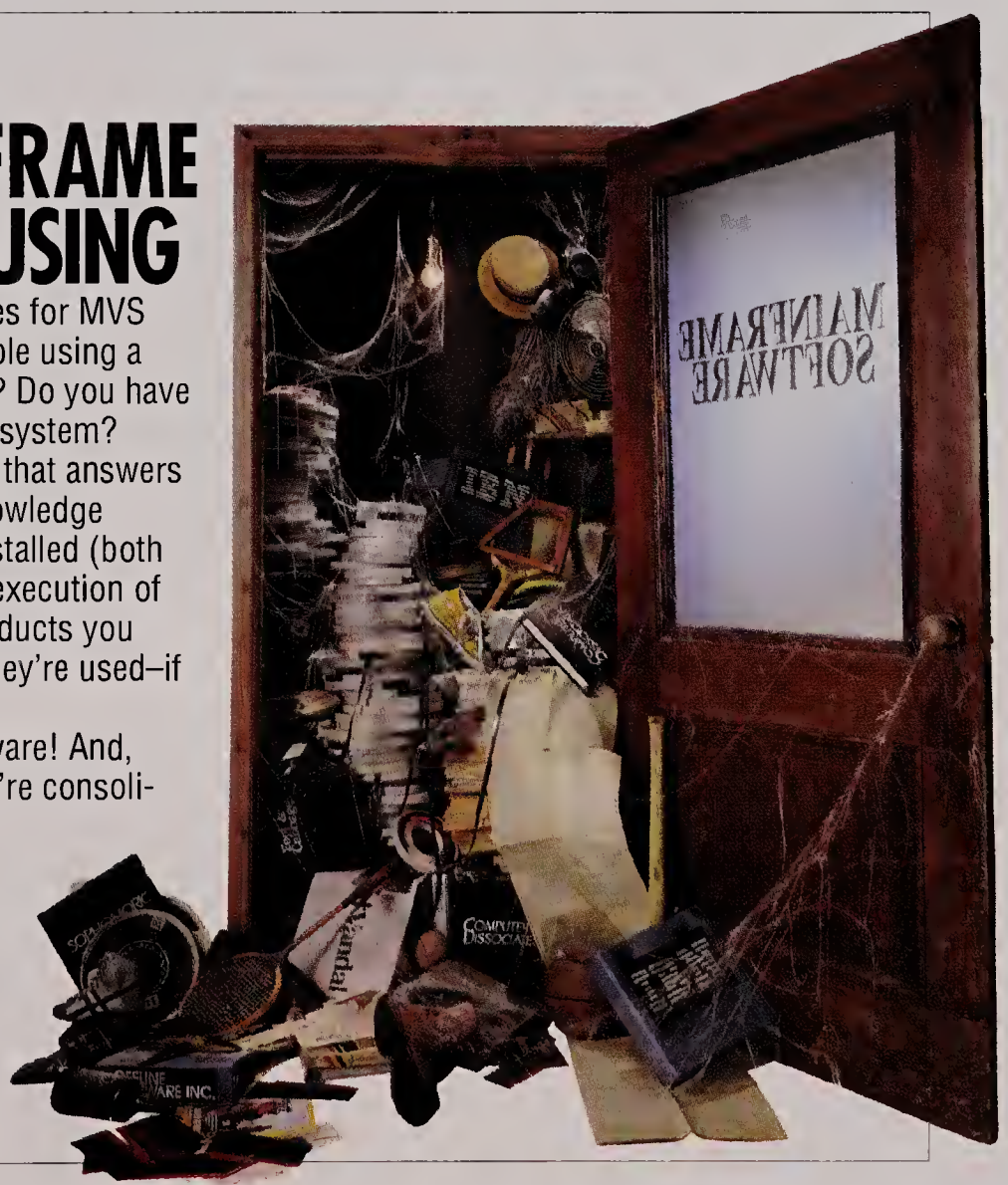

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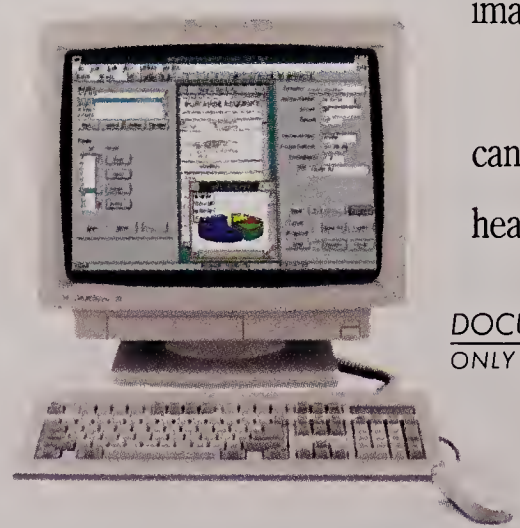

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WORLD TRAVELERS

Going global requires IS managers and their staffs to start thinking in a new way. Training, planning, salesmanship and a little sensitivity can all do wonders for the effort's success.

To be a truly global organization, it's not enough simply to operate in many countries. Managers must develop a global mind-set and help their staffs do the same. For IS, that means not just becoming aware of cultural and language issues but also viewing the entire company as a whole and providing uniform information about customers, suppliers and processes throughout.

"If you're really going to compete on a global scale, you'll think of your manufacturing or processing plants as one, and you'll move your capacity around all over the world," explains Tobey Choate, vice president

BY MICKEY WILLIAMSON

ILLUSTRATION BY MARK FISHER

and managing director of information technology at consultancy Arthur D. Little in Cambridge, Mass. "You'll think of your customer base and your asset base as one, and you must have a fairly uniform and detailed level of information to do that. If you're using the same manufacturing system worldwide, you will get the same information, which will allow you to manage that capacity worldwide."

> "FROM AN AMERICAN PERSPECTIVE, PEOPLE within an IS organization have always had the luxury of being able to communicate in English. Now, while quite often the senior individuals in these other countries will have a good grasp of English, the people who are using the systems may not."
>
> –CHRIS LONGSTAFFE

In the common view, global thinking is a giant step for many Americans, says Choate. "My experience is that U.S. people, myself included, tend to be much more parochial than those who have grown up in smaller countries, where people move from country to country the way we move from state to state," he says.

Study Abroad

One way to groom members of the IS staff for global operations is to send them overseas for a while, allowing them "to see what it's like to see the mother ship from another direction and also to learn what it means to live in another culture," Choate advises. Another way is to create project partnerships between headquarters-bound IS personnel and, preferably, businesspeople from foreign units of the company. If that is not possible, then working with IS people in other business units will at least give staff some experience in considering another group's point of view.

Global Goals

The next step is to start thinking about ways in which information technology can strengthen the company's competitive position in the global economy. This, of course, depends on the corporate business goals, and the familiar advice about keeping IS in step with the corporate strategy is no less true in global commerce than it is elsewhere. CIOs who are conversant with the information- and technology-planning process as it applies to specific areas in which the company competes will find this a fairly familiar task. "When you start thinking globally, you think about how to apply the results of that process to the problem of competing globally," says Choate.

Language and Culture

At least as many of the issues facing the global CIO will have to do with people as with technology, say those who have been there. Language is the most obvious problem, according to Chris Longstaffe, director of Esprit Ltd., an international information-technology and change-management organization based in Chesham, England. "From an American perspective, people within an IS organization have always had the luxury of being able to communicate in English. Now, while quite often the senior individu-

READING LIST

The following are a few sources of further reading for companies considering going global:

Global Dreams: Imperial Corporations and the New World Order, *by Richard J. Barnet and John Cavanagh (Simon & Schuster, New York, 1994)*

Blunders in International Business, *by David A. Ricks (Blackwell Business, Cambridge, Mass., 1993)*

Global Embrace: Corporate Challenges in a Transnational World, *by Henry Wendt (Harper Business, New York, 1993)*

Business International's Global Management Desk Reference, *by Shirley B. Dreifus and Business International Corp. (McGraw Hill, New York, 1992)*

The Ernst & Young Resource Guide to Global Markets, *by James E. Searing and Ernst & Young (Wiley, New York, 1992)*

Managing Across Borders: The Transnational Solution, *by Christopher A. Bartlett and Sumantra Ghoshal (Harvard Business School Press, Boston, 1989); video series also available*

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COLOR BY MARK FISHER

als in these other countries will have a good grasp of English, the people who are using the systems may not."

Being able to adapt to other cultures and languages may be difficult for some members of the IS staff, and those people will need support, training and a bit of charity in the first few evaluations after the switch to the global focus is made. Woody Mewborn, vice president of Esprit's U.S. operations, adds that the entire IS organization needs to understand how and why its role—and the roles of the individuals within it—have changed and will continue to change in a global economy.

Selling Standards

Getting people to agree to standards and protocols is another important task for the CIO, says William Schimoler, vice president of trading technologies at Chase Manhattan Bank, in New York. "In essence, a protocol is an agreed process of exchanging information. Unless both sides of a particular communication agree to that protocol, they won't understand each other. You really need to get people to [buy in] because the most important thing is for everyone to understand why a particular set of standards has been adopted." Explaining the relationship between the proposed standard and the technical needs of the business is the best way to gain concurrence, he adds.

Choate says that "sensitivity and patience are key to success in bringing a company together to compete globally. [The CIO must be] sensitive to the fact that people have pride and intellectual and financial capital invested in what exists."

Global Partners

One way of appeasing people who perceive the move to globalization as a reduction in their own power and authority, Choate says, is to distribute global responsibility among the regional or national organizations. "For example, a CIO might say, 'United States, you're going to be responsible for the order-entry application. Get your colleagues involved, and build one that everyone will use. Europe, you do the manufacturing system, and that's what we'll use worldwide.' "

To some extent, that technique involves co-opting people, he admits, but it also demonstrates that globalization doesn't necessarily mean centralization. It gives global responsibility to people who may not have previously considered themselves at the locus of power. That makes them sensitive to issues they would otherwise never have encountered.

Globalization, Choate concludes, is "a big headache, but it's also a big opportunity for someone to excel. It takes a... diplomat: [someone] who can show benefit to the other organizations and [convince them] they're participating as a full partner." CIO

"SENSITIVITY AND PATIENCE ARE KEY TO success in bringing a company together to compete globally. The CIO must be sensitive to the fact that people have pride and intellectual and financial capital invested in what exists."

–Tobey Choate

Mickey Williamson is a technical journalist based in Warwick, Mass. Her Internet address is qwertygroup@mcimail.com.

GLOBAL RESOURCES

There are many publications and organizations that can help companies investigating global markets. The following are a few examples:

PUBLICATIONS

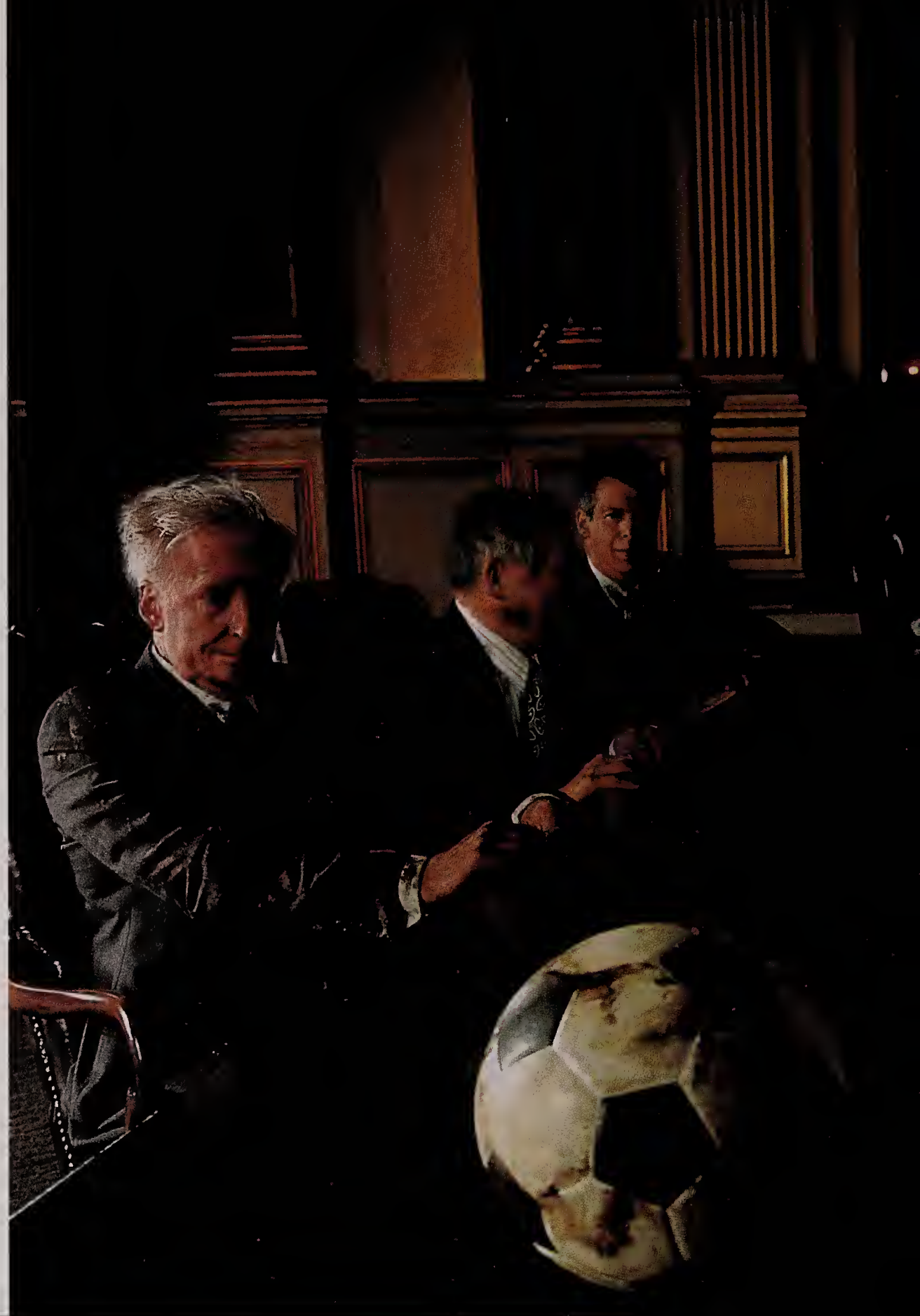
- *World Economic Outlook, International Monetary Fund*
- *World Tables, World Bank; published annually*
- *The World Factbook, Central Intelligence Agency; published annually*

ORGANIZATIONS

- *International Trade Council, Alexandria, Va. 703 548-1234*
- *International Development Institute, Alexandria, Va. 703 684-1980*

Sources: Arthur D. Little & Bentley College Solomon Baker Library

Legacy systems. Network growth. Mounting cost pressures. ◈ Compared to the challenges of running the World Cup games, these computing issues make for a pleasant day at the office. ◈ No other organization must come together so quickly, move so rapidly, in so short a time, as the World Cup games. ◈ Indeed, it is the world's largest, most watched, virtual corporation. ◈ And behind it all, running the whole thing, is the world's largest client/server network ever used for a single sporting event. ◈ More than 1,000 Sun™ workstations using the Solaris® operating environment are networked with 15 Sun servers, including two SPARCcenter™



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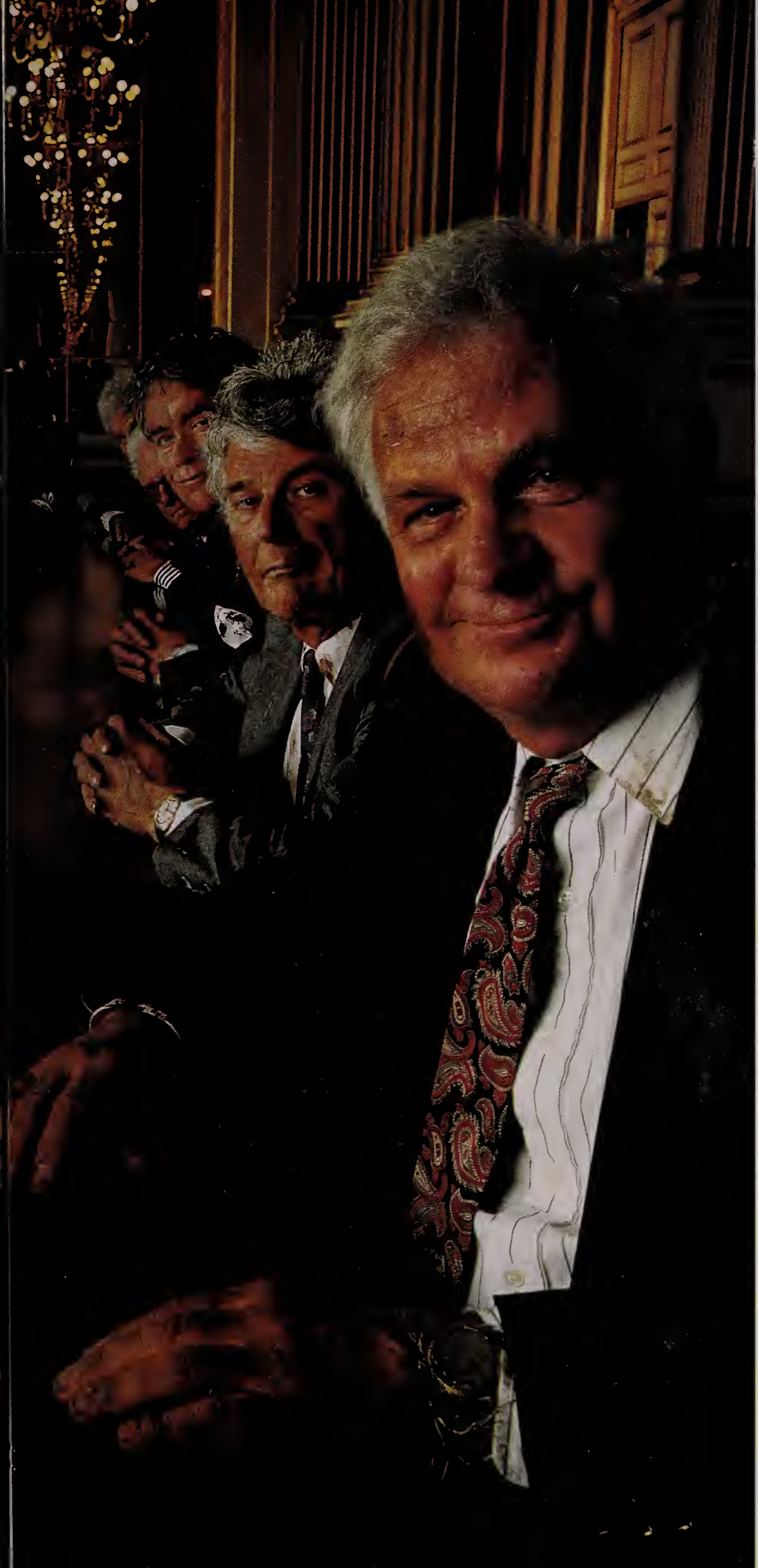

field operations for 24 World Cup teams in four different time zones. The entire business operation of the World Cup games — more than $1 billion — will be run on Sun computing. ◈ And remarkably, the entire network was installed in less than four months. ◈ Which may be why, as the World Cup games are kicked across America, a few eyes may also be on the computer system that was judged simple enough to manage, yet powerful enough to run the world's largest sporting event. © More than 135,000 businesses are using Sun systems, powered by the SPARC® chip and the Solaris operating environment, to gain a competitive advantage. The World Cup is just one. To learn more, call 1-800-426-5321, ext. 755. Or, on the Internet, access Sun's World Wide Web server at http://www.sun.com/

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ARTIFICIAL INGREDIENTS

Deep within increasing numbers of business-critical applications dwells a knowledge-based kernel of code that makes a defining difference in the systems' capabilities

BY SARA HEDBERG

AFTER THE OVERHYPED FLURRY of interest in artificial intelligence (AI) in the mid-1980s, the fallout of disappointment led many to conclude that AI would never get off the launch pad. But in fact, AI has quietly rebounded and is enabling a wide variety of smart applications with impressive economic impact. AI-based applications—in particular, expert systems/knowledge-based systems (KBS)—have been growing steadily. Here are a few examples:

- As millions of viewers around the world watched the athletes compete in last winter's Olympics, police schedules and paychecks in Lillehammer, Norway, were being generated by a KBS. In fact, the government is so pleased with this new scheduler that it plans to deploy it countrywide to its roughly 450 law-enforcement offices by early summer.
- Future releases of Microsoft Windows will have an on-board self-help system that relies on AI case-based-reasoning techniques, which store and index an experience base of user problems that can be sorted for congruences with newly arising problems. (This makes case-based reasoning nicely suited for a broad range of help-desk uses.)
- At Mrs. Fields Inc., headquartered in Park City, Utah, the entire chain of stores is managed using a suite of expert-system applications that do everything from running back-office accounting operations and scheduling labor to assuring consistency and quality in cookie recipes. In 1990, Randy Fields spun off Park City Software to commercialize this expert management system, now in use at such companies as Woolworth Corp. and the Disney Store.
- Worldwide, there are 30,000 Xerox Corp. mid- to high-volume copiers and duplicators remotely connected to a knowledge-based system that increases the machines' uptime. The units are equipped with sensors that communicate interactively via modem with the expert

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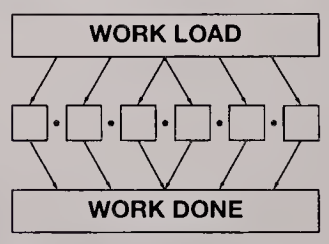

Scores of microprocessors inside the servers each handle parts of the job (just like these little guys), while the system as a whole coordinates and seamlessly completes the project. Everything from existing applications to emerging ones like data mining and video-on-demand.

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system. This remote interactive communications (RIC) system diagnoses—and anticipates—problems and directs repairs, often before failures occur.

Xerox will not release any ROI numbers for its system because of the perceived competitive advantage. (And competitors are now releasing similar systems.) But the importance of the application is obvious when you consider Xerox is expanding the number of products supported by this application.

These kinds of systems highlight three trends in AI applications today. First, a knowledge-based system is usually part of a larger integrated, and often distributed, solution. Second, project success with AI breeds more systems and more success. Third, for competitive reasons most companies are publicity-shy about their AI experiences. For example, one of the largest manufacturing corporations in the United States declines to go on record about the more than 50 knowledge-based mainframe applications running in its back offices making payroll and other applications smarter. One of these systems alone is saving $1 million each month.

Pacific Bell is another company keeping mum about the specifics of its expert systems. "It is very clear we will have a continuous portfolio of AI systems," says Eric Firdman, executive director of strategic information systems. "AI may be only 15 percent of the code—but this 15 percent may bring 80 percent of the value added of the entire system."

STORIES OF AI applications abound in virtually every industry segment. "There are at least 10,000 applications running with an AI component," estimates Harvey Newquist, author of The Brain Makers, a History of the AI Business, and editor of the newsletter Critical Technology Trends.

And the numbers keep growing. For instance, Maynard, Mass.-based Digital Equipment Corp. has aggregate savings of $200 million annually with a suite of more than 50 knowledge-based applications woven throughout the fabric of its worldwide business, according to Rich Maxwell, manager of Digital's Knowledge Based Solutions group. "These systems help us with everything from how we build product to how customers order product to how we support product once the customer has it," says Maxwell.

> "THE INCUBATION PERIOD OF AI IS OVER, AND THE ADOPTION CURVE IS TURNING UP ON AI TECHNOLOGY."
>
> *–Joe Carter*

"We're beyond the early adopters of AI," asserts Joe Carter, managing partner of Andersen Consulting's Center for Strategic Technology in Palo Alto, Calif. (see related story, Page 78). "The first wave of applications is in place and proven. The incubation period of AI is over, and the adoption curve is turning up on AI technology."

Andersen's knowledge-consulting practice is a case in point. Carter is increasing the size of his group by 30 percent next year. He now has 80 people, who spend half their time on client work and the other half providing internal support. His group supports some 200 to 250 people companywide some of whom, at any given time, are working on projects incorporating AI.

For example, Carter's group assisted staff at Andersen Consulting in Washington with a scheduling application for Baltimore Gas & Electric. The utility, which serves 1.2 million customers, wanted to improve the scheduling and routing of service calls for customers moving in and out of residences. Scheduling was a complicated manual process requiring 26 clerks and two or three dispatchers to process as many as 2,000 work orders a day.

Andersen had already put a large customer information system (CIS) into production. Teaming with the utility's IS department, they built the knowledge-based scheduler as part of the CIS. Now in operation for over a year, the scheduler has resulted in a 42 percent reduction in the scheduling workforce, more-efficient scheduling of routes, a 48 percent overtime savings and a 25 percent reduction in back orders. What used to take three routing clerks eight hours each now takes the scheduler 20 minutes. The system paid for itself in about six months.

"This is the kind of application we couldn't have done without AI," says Andersen Partner Mark Snead. "You can't do it with procedural code. This is a good example of new technology applied to a particular business problem. We could have automated the shuffling of paper. But AI solved the problem of doing the routing."

IN FACT, reengineering seems to target just the kinds of areas where knowledge-based systems can make a big difference: improved service, reduced operating costs and faster response to market conditions. In a growing number of cases, AI plays a visible role in supporting business-process reengineering (BPR).

One AI vendor, the Carnegie Group Inc. (CGI) in Pittsburgh, finds that the majority of its business these days involves working with customers who are initiating reengineering efforts. CGI President Dennis Yablonsky says CGI's reengineering projects fall into three areas: knowledge consolidation, knowledge coordination and knowledge dissemination.

Knowledge consolidation—integrating knowledge from various "experts"—is at the heart of a KBS reengineering application that CGI built for US West in support of that company's goal to expand its market among customers with home offices.

Telemarketers sell services with the assistance of a knowledge-based system that infers prospective customers' needs from their answers to a series of questions. The system then configures product solutions. The application has captured the knowledge of the marketing department, along with two or three other experts, and packaged it in a knowledge-based system (connected to an Oracle Corp. database and delivered over a client/server architecture). A recent four-month trial was encouraging enough that US West will hire and train 250 new telemarketers over the next 18 months, according to Bryan Meincke, US West's manager of marketing and sales integration for the home-office business.

In the area of knowledge coordination, Ford Motor Co., in Dearborn, Mich., uses a CGI-built knowledge-based system to audit circuit-board designs submitted by the electrical engineering group to seven Ford manufacturing plants around the world. The designs are checked for conformance to manufacturing requirements and constraints (the aspect of "coordination" derives from the system's objective of meshing the two expert universes of engineering and manufacturing).

Prior to implementing the system, a high percentage of the designs were rejected by the plants because they could not be manufactured due to various constraint violations. The multiple design iterations were costing Ford time and money, according to Dave Fawcett, Ford's technical manager of expert systems in the electronics division. Now, says Fawcett, "Our engineers get their designs checked automatically. And because there are no reworks, they can spend more time working on new designs."

According to CGI's Yablonsky (Fawcett, citing company policy, declined to confirm any numbers), less than 5 percent of the designs are returned, down from a 55 percent preimplementation reject rate. As a result, the design-to-market cycle is shortened, which in turn speeds product evolution.

Another KBS application at Ford illustrates a different sort of knowledge coordination: the creation of manufacturing schedules for an entire plant. Using software from Inference Corp., of El Segundo, Calif., Ford built a scheduling system whose multiuser interface supports the ability of multiple schedulers to log in and work on the same schedule in real-time.

According to Bill Malinak, project leader of shop-floor scheduling in Ford's Manufacturing Management Systems group, the task of scheduling production at a plant formerly took one person the better part of a week; now it takes only an hour a

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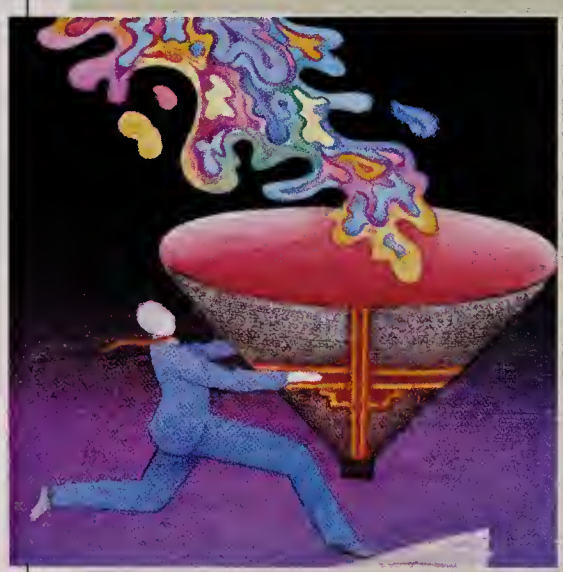
The Knowledge Edge

If the new basis for competitive excellence is intellectual capital, AI will be a key to achieving mastery

"The basis of competitive advantage in the 1990s is how well a company captures and deploys its knowledge assets," says Joe Carter, managing partner of Andersen Consulting's Center for Strategic Technology in Palo Alto, Calif. Carter, a veteran in integrating leading-edge technologies into the business context, believes that "the time of cost advantage as the basis for competitive advantage is behind us. Companies must look at core competencies and use technologies to get ahold of knowledge assets and make use of them."

Carter is optimistic that enough tools and techniques now exist that, "regardless of the form of your knowledge, we can capture it." But it wasn't always so: "When our options were Cobol and relational databases, trying to shoehorn knowledge in was ludicrous. There was no way to effectively and economically capture expertise, case studies and common sense in conventional programming techniques. Now there is a broad suite of commercial tools to capture the expertise."



Andersen's knowledge-technology practice has expanded beyond expert and knowledge-based systems. "We are using media technologies and case-based reasoning [CBR] as well," says Carter. "If it looks like the best way to capture knowledge is to film it, then index and retrieve it using CBR, we will. If information is by nature rules—such as tax regulations, legislation and policies—then we'll use rule-based systems. If [it's] highly associative—such as correlations between demographic information and what people buy—then neural nets are best.... We try to do as little transformation as possible of the knowledge. We don't care what form the knowledge takes—we have the tools."

Carter believes that IS organizations need to adapt their scope beyond data management in order to meet today's business-application requirements. "IS needs to retool—to see its scope as knowledge managers. IS must get beyond the 'create-report-update-delete' way of thinking. Yes, that saves money. But it is only one-third or less of the opportunity that's there.

"In the next decade," he predicts, "IS will need to walk out into the organization, see knowledge assets and capture them in one form or another. It needs the tools and techniques for knowledge capture and deployment." And that means AI tools.

–S. Hedberg

day. Consequently, schedulers can extend the planning horizon from one week to 28 days. Malinak says the system is installed in six plants, and Ford plans to roll it out to all 60-plus plants worldwide.

Digital provides another example of how AI is being used explicitly to support reengineering—within the company itself, in client consulting engagements and in a new shrink-wrapped BPR business-modeling software tool called DECmodel. DECmodel's dynamic business-modeling capabilities, which rely on knowledge-based technology, let users build and test drive simulated process redesigns before implementing them. (The $9,500 tool runs on Windows-based PCs or laptops.)

AI is also cropping up increasingly in help-desk applications. At US West, knowledge-based systems are used in support of legacy systems—the very platforms whose expert custodians are becoming an endangered species. According to Lynn Fischer, director of knowledge-based engineering at US West, providing knowledgeable "electronic assistants" to the help-desk staff has made an 80 percent dent in the response time for legacy-system problems. Fischer calls KBS applications a "very important part" of US West's corporatewide reengineering initiatives.

"EXPERT SYSTEMS and AI extend what we can automate," says Lynne Helpin, manager of Xerox Business Solutions Development, a 70-member team that is part of Stamford, Conn.-based Xerox Corp.'s Global Integrated Business Solutions Group (GIBS). With AI, Helpin says, "we can automate thought processes. Before AI, the boundary was at the paper-flow process. Now we can capture the intellectual processes."

For example, says Helpin, AI can be used to build, if not exactly a better spreadsheet, at least a better means of interpreting spreadsheet data. "We can build applications that assist less-experienced personnel in analyzing business trends. [AI] systems have a

ILLUSTRATION BY JAMES ENDICOTT

sense of what to look for. It's the notion of intelligent agents that observe activities in an enterprise, recognize when things go out of bounds and highlight them."

At Xerox, the stature of AI tools has evolved from arcane and specialized to become a well-accepted piece of the overall systems-development resource. In 1988, Xerox established the KBS Competency Center (KBSCC) within corporate IS. With about 50 programmers, KBSCC was charged with building AI applications and transferring the technology to other groups. Since then, the KBS center, along with other advanced-technology specialists, has been folded into the GIBS Group, a reorganized section within IS under the direction of Scott Hatfield. "We have moved what were technology-oriented groups into business-solution groups," explains Hatfield, who reports to the CIO. "We realized when we did AI projects that AI was about 25 percent of the project and the rest was normal application delivery." Having now eliminated the compartmentalization of the toolset components, Hatfield's group can focus on the overall business solution, driven by the customers' needs.

> "EXPERT SYSTEMS AND AI EXTEND WHAT WE CAN AUTOMATE. WITH THEM, WE CAN AUTOMATE THOUGHT PROCESSES."
>
> *–Lynne Helpin*

"AI is not a specialized function here," he says. "It is a set of techniques in our [programmer] toolkit that we use routinely.... When we need AI, we reach into the toolkit for rules, for an inheritance mechanism, or whatever we need to deliver the application most efficiently," he adds.

Indeed, a 1993 Gartner Group report on reengineering identified KBS as one of the "key enabling technologies...to make [reengineering projects] viable." Xerox's Helpin agrees. "The practice and methods of KBS are incredibly adaptable to what application developers need today," she says. "There is more demand for smarter, deeper applications. And [the benefits] are incredibly difficult to get in any other way." CIO

Sara Hedberg is a freelance writer based in Issaquah, Wash.

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Meet cyberspace's finest, a trooper in the 21st century's Information Highway Patrol. His duty is to guard the fragile boundary between on-demand full-motion connectivity and anarchy....

BY STANLEY BING

I was having a cup of virtual java in the Denny's off exit 6 when I got the call. Somebody was stuck by the side of the info highway near the Diller underpass. I drank up, tossed Marge a fund-transfer chit and got my modem out of there at 14,400 baud-plus. You can't move too quick when the database is being impacted. Protecting it is my job. I carry a badge.

The call turned out to be a woman in distress, standing on the shoulder, wearing nothing but her bathrobe and a dazed expression. Lost, for sure, I thought. But it was worse than that.

"I can't find my remote," she sobbed. "Five hundred options! How am I supposed to find them...manually?"

On a better day, she would have been worth spending some time with. She had all the contemporary assets: a pair of pink eyes that kind of ran when you looked too deeply into them, a couple of legs you could tell had some passable calf muscles when they were in even infrequent use and the typical size 38-D index finger bulked up from constant remote work. She even had a hint of color in her hair, which a lot of them don't anymore, thanks to the amount of time they spend indoors. "How can I find the two-hour block of *Mary Tyler Moore* on Nick at Nite?" she honked at me. "I can't scroll around...one channel at a time! I'll go mad!" Here she was swept away by gales of laughter. I hated to slap her back to earth. But I had to.

"A woman is responsible for her own navigation equipment, ma'am," I said, stepping back and tipping my hat, which also functions as a remote satellite dish when the transponder to Central InfoBase is down. I handed her a loaner. "You go on home now and make sure to drop that in the mail just as soon as you pick up a new one, ma'am," I said, getting back into my vehicle. I left her clutching the remote to her chest. This job is tough and gritty. It doesn't have many satisfactions, but helping people out of trouble like that is one of them.

With a couple of minutes to kill, I cruised some of the remote corners of the academic net via diagnostic probe, making sure there were no unauthorized people on the system loitering about without passwords. In the future, there will be no unauthorized people, mark my words. Don't ask me where they'll go, but I'm pretty sure we'll think of something.

My Newton palmtop lit up like a house on fire.

"Get to the Red Roof Inn and Interface, and step on it!" said Smitty, who handles dispatch. "We got a tip that a bunch of rogue marketeers from Procter & Gamble are attempting to filch personal demographics from the centralized database."

Before I had a chance to turn that baby over more than once or twice in my mental database, a gigabyte of data core-dumped into my

ILLUSTRATION BY PHILIP ANDERSON

little handheld computer. I knew I would need it if I was going to make the beef stick. "Departed for scene at 1300 hours," I jotted down on the screen with my digitized pen for immediate cellular transmission to HQ. This simple message, however, was immediately translated by the character-recognition software as "Dingo smells like hot turkey haunches." The modem also had trouble making a connection via satellite, so the entire transaction was sort of...unsatisfying. Look, it's only 2035. By the turn of the century I'm sure they'll work out the kinks.

Meanwhile, I had no time to lose. I burned fiber and was there in a couple of nanoseconds.

It was a trap.

The gang was holed up in the old Howard Johnson motor lodge just south of Microchusetts. I figured they intended to remain there unless somebody physically appeared on the scene and truncated their connection to the mother cable.

I pulled up in front of the place at 1900 hours. It was very quiet, but that wasn't unusual. It's very quiet every place these days, what with people locked into their electronic cottages from morning to night, conveniently doing all their banking, shopping and much of their jobs over the electronic spider web that connects all living things on the planet. And I tried to send for backup, I swear I did. The computer was down.

I exited my hovercraft and made my way past a 35-year-old Toyota Corolla that had actual paper magazines on the back seat, and even a book. I was amazed to see, lying in the middle of the dashboard, some actual monetary units that people used to employ before electronic transfers went into effect for even the most nominal transaction. I went to the lobby door. I could see more than a hundred people milling about inside, laughing, eating what looked like tiny meatballs and miniature egg rolls on toothpicks. One of them was playing a guitar.

"Information police!" I yelled as loud as I could. Then there was a bolt of ugly black fire in the back of my head, and the lights went out.

I woke up tied to an actual chair. All my remote hookups had been removed from my head, and my cellular phone, note pad and portable modem had been disabled. I was as electronically naked as the day I came into the world and, for the first time in my life, miles off even the most minuscule capillaries of the superhighway—with no chance of rescue. With my lines cut, who could possibly know where I was or even, when you get right down to it, whether I existed at all in any meaningful, contemporary sense of the word?

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The room was jammed with people. Many of them were reading things on paper. Some were even talking to one another. In the corner was a tall, bushy-headed man of about 50 who was quite obviously a serious underviewer of exercise programming. On his chest was a little plastic stick-on that said, "Hi, I'm Ralph. Thank you for not bothering me about my smoking." He was smoking a large Macanudo. He was also, to my amazement, reading what looked like a physical newspaper. I wasn't sure at the time, because I had never seen one, but that must be what it was. It had some pictures on it, sure, but a whole lot of words, too. And he was reading without moving his lips.

"In the name of your government and the group of eight corporations that now own all significant business operations in these United States, I urge you to cease and desist your nondigital activities and release me at once," I said in as commanding a voice as I could muster. "You will each be issued a punitive bar-code status, but beyond that no harm will come to any of you."

I might have saved my breath for all the good it did me. The group gave a lusty laugh and settled back into its variegated activities. The guy with the smokes strolled over.

"Hi," he said. "As you might have guessed, we live here. There are others like us in a lot of places. Most of us are former employees of companies that no longer exist. Davis over by the window was at Paramount, for instance. Welch, there next to the salad bar, was something at GE before it became a part of BellSouth. I was at Hearst Magazines before Barry Diller decided he wanted it as the foundation of a new shopping service.

"Where are the women and children?" I asked.

"Don't worry. They're someplace...safe."

There was a pause as we both scoped things out.

"We try to throw a monkey wrench into the system," he said softly. "Like...we call up for information on the database and request a search that will take months to complete. We sign on and off the HBO and Showtime mini- and maxi-packages, which drives the cable company crazy. But there isn't a heck of a lot that we can do to restore a rational standard of living except to...not participate, that's all. Which, by the way, is what we're asking of you. Want to join us?"

"Are you tired of interacting? Did you ever really want to interact at all? Did anyone ever ask you if you wanted to interact? Or did they just do it without asking you? Did they do it just because...they could?"

"Never," I said.

"Let me ask you a couple of questions," said Ralph, leaning in now. I could smell the tobacco on his clothing. It was a smell of long ago, of old comic books and discontinued aftershave. I liked it. "Do you really enjoy reading your newspaper on television? Or would you prefer to go back to poking at it while sipping coffee in the kitchen? Do you want to work, play games and watch movies on the same monitor in the same room, or would you like to go back to having different monitors for your computer, television and game cartridge, like they did in the old days? How about the monitor in your bathroom that Whittle Communications put in to replace your magazines? Like that? Or the 500 channels of entertainment available to you, how many do you really watch? Sixty? Eight? Three? Do you miss watching the World Series and Super Bowl on free TV? Do you miss shopping for your clothes in a store? Do you miss stepping out for a couple of minutes to make a deposit at the bank? Do you remember what it was like to take Volume S of the *World Book* off a shelf and find the entry for Sweden—without instituting an electronic search that also pulled up all associated topics from 'Reindeer' to 'Suicide' and assembled the results into a coherent but totally mediocre report? In fact, bud"—his nose was almost touching mine—"are you tired of interacting? Did you ever really want to interact at all? Did anyone ever ask you if you wanted to interact? Or did they just do it without asking you? Did they do it just because...they could?"

I think I was kind of bewildered by that point. Anyhow, he must have picked up something because he untied me, gave me back my modem and cranial network implant, and told me I could go.

And yet, I didn't go, you know. I will. Soon. I know that. I have a job, a life to go back to. But right now...I think I'm going to go and...read a book. Maybe talk directly to some people, instead of doing it through an electronic bulletin board. Interact with them, you know. And after that, I think I'll turn on the television and just, you know, watch something. Not do anything with it, you know. Just veg out. Yeah. I'll just surf the eight or nine channels that aren't scrambled on the 500-channel system, and later maybe I'll play some computer games. They have an old IBM here that isn't even networked at all. Isn't that amazing?

Not to say that all the fabulous stuff we have today isn't. Great, I mean. But for a while, I'm pulling off the highway into this little rest stop. Tomorrow, maybe I'll send for my family. Ten-four, gang.

Over and...out. CIO

This column was first published as "True Tales of the Information Highway Patrol" in the February 1994 Esquire. *Reprinted courtesy of the Hearst Corp. Stanley Bing is a contributing editor of* Esquire. *His book,* Crazy Bosses, *is out in paperback (Pocket Books).*

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Quality Team Players

A variety of software tools are available to help companies in the great quest for quality

BY JOHN EDWARDS

Pursuing total quality management (TQM) is something like searching for the perfect golf course: an endless quest. But while scouring the world for the ultimate golfing venue is the stuff many CIOs' dreams are made of, designing and implementing a model TQM plan can be as frustrating as trying to blast your way out of a sand trap with a bent putter.

As in golf, using the right tool for the job is critical. The software market offers a wide array of products to help plan, implement and manage a TQM project successfully. They range from tutorial packages to tools that are designed to handle specific TQM-related tasks to ambitious application families that aim to bring all aspects of TQM to an entire enterprise. Finding the right products for a particular company or department requires both a knowledge of the TQM philosophy and an understanding of the organization's ultimate goals.

TQM dictates that quality control be factored into every aspect of the business process and that all members within a company or department have at least a general knowledge of the plan's objectives. It requires all company workers—from the CEO down to entry-level staffers—to focus on customer needs, tolerate no defects, complete tasks in the shortest possible time, measure the system rather than personal behavior and make everyone in the organization feel that they have a stake in the outcome of the venture.

Today, TQM is deeply ingrained in many U.S. businesses, while others wonder if the methodology can be applied to their operations. A 1991 study by Arthur D. Little Inc., a management- and technology-consulting firm based in Cambridge, Mass., found that TQM-style problem solving had been tried by at least 54 percent of the 701 U.S. private-sector companies that were contacted. On the downside, only 36 percent of the organizations reported any success with the concept. Many TQM software experts believe that at least some of the discipline's considerable lack of success can be attributed to management's failure to use the appropriate software tools. Since TQM requires users to continuously measure and monitor various types of data in order to meet pre-established quality goals, software can play a critical role in the TQM effort.

Many TQM efforts collapse because the CIO fails to make the transition from "theoretical fluff down to nuts and bolts," according to John Cachat, president of IQS Inc., a TQM software-development, consulting and training firm based in Cleveland. He notes that CIOs involved in TQM projects can select from a wide array of tools, including all-in-one products and software families. These tools allow users to monitor data collection, customer management, preventive maintenance, suppliers, documentation, employees and various other aspects of the TQM venture.

Cachat believes that TQM software tools can significantly cut costs and increase productivity in quality-assurance functions. "Computerizing the quality function creates an environment for rapid and continuous improvement," he says. "When input is accurate and complete, computer-generated information is of high qual-

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ity and accessible in a variety of formats." He argues that many organizations get bogged down in a chain of paper-based statistics and reports, effectively reducing their workers to the status of "power clerks." Cachat says, "Successful organizations will let the computer perform clerical tasks, which will free their technical people to creatively solve current problems and prevent future ones."

Greg Madey, associate professor of computer information systems in the graduate school of management at Kent State University in Kent, Ohio, agrees with Cachat on the concept of using computers to take the "grunt work" out of managing the TQM initiative. He notes that software is widely used to speed the performance of number-intensive TQM tasks, such as inputting data and compiling statistics. "You can perform most TQM tasks on paper, as many companies still do, but software will enable you to perform repetitive tasks much more quickly and efficiently," he says.

"If you're dealing with tough, thorny problems, any sort of a decision aid helps you to structure the situation and forces you to look at it from a different perspective."

–Greg Madey

Madey suggests that CIOs resist the natural urge to look at TQM as a single software category, noting that it's more accurate to view it as a concept that can be implemented with the help of a broad spectrum of products. He asserts that just as organizations use virus checkers, log-in programs, auditing tools and many other products to meet their security needs, so they should look at a variety of software products in different product groupings to address their TQM requirements (see box for a listing of major TQM software categories).

According to Madey, decision-support products should be the central element in any organization's TQM software arsenal. He notes that TQM-oriented variations of everyday software tools such as spreadsheets, databases and schedulers can be used for TQM purposes. While many software publishers offer specially tailored versions of these products for their TQM customers, off-the-shelf products can also play an important role in an organization's TQM strategy, says Madey. "If you're dealing with tough, thorny problems, any sort of a decision aid helps you to structure the situation and forces you to look at it from a different perspective."

George Florit, president and CEO of Michael-Delia Inc., a TQM soft-

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TOOLS OF THE TRADE

TQM software comes in a wide range of flavors. The following are some of the types of products that can be used to plan, implement and maintain a total quality management project.

- **Tutorials** help management and/or rank-and-file employees understand the concept and goals of TQM.
- **Flowchart applications** allow managers to diagram the structure of a TQM project.
- **Project-management programs** help users organize and track an ongoing TQM project.
- **Reporting applications** convert raw TQM data into charts, graphs or printed text that can be analyzed by managers and staff members.
- **Forecasting software,** with the help of a spreadsheet-type product, extrapolates historical TQM data into levels or conditions that may exist in the days, weeks, months or years ahead.
- **Scheduling programs** with tracking tools allow users to monitor the movement of products and vehicles.
- **Data-quality utilities** allow users to scan for data defects, measure data output and monitor the level of improvement or degradation.

–J. Edwards

ware developer located in San Diego, says that a CIO involved in a TQM project will need help in determining how his or her organization's workers use their time. "In most IS organizations, the methodologies utilized for the capture of time are woefully lacking," he says. "These organizations utilize pieces of paper or they gather the information in broad buckets. As a result, management isn't in a position to ensure that their TQM program is being achieved." He says that in many organizations, the only time a TQM project's condition becomes apparent is when things go haywire. "And then you're in the position of reacting to situations instead of being proactive."

Florit notes that many CIOs turn to project-management applications to keep track of their staff and projects. But while many off-the-shelf project managers claim to offer TQM capabilities, few actually live up to their promises, he says. "The emphasis with project managers is on

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planning a project, as opposed to managing its effort," he says. "Additionally, many project-management systems don't give views of all work and all people all of the time. Therefore, many project managers aren't really applicable to full-fledged TQM implementations."

Florit suggests that the CIO look for a product that can track all the human resources that are contributing to the mission. "The software must be able to track the way people interact, delineate between the different types of work activities and cross-reference all of this information back to the goals of the TQM mission."

Many CIOs overemphasize the "total" aspect of total quality management, says Wendy Sternick, president of Kaetron Software Corp., a publisher of TQM tools based in Woodlands, Texas. She points out that businesses can implement TQM in different ways and at various levels of intensity. "I think it's a mistake to look at TQM as an all-or-nothing proposition," she says. "Even if you're unable to fully implement TQM at the moment, you can grab hold of the aspects of quality management that will have the most immediate impact on your organization."

"You don't want to get so caught up in the mechanics of the software that you lose the ability to work creatively."

–Wendy Sternick

Sternick argues that regardless of the type of quality effort being initiated, a flowchart application can help management establish clear objectives and allocate responsibilities to individual managers and staff members. "Even if you're sitting in a brainstorming session, trying to figure out what needs to be fixed first and looking at the problems that relate to a particular process, flowchart software can help you turn vague thoughts into reality," she says.

According to Sternick, flowchart programs allow users to create structured diagrams that can be used on either the departmental or enterprise level. In a full-fledged TQM effort, they can help mid-level managers prepare documentation for the International Standards Organization (ISO), which has developed a quality standard (see "A Standard Response," *CIO*, June 1, 1993). The software can also aid users involved in a less formal TQM effort in visualizing and analyzing processes and workflow. Sternick advises users to work with a program that allows flexibility in layout and design. "You don't want to get so caught up in the mechanics of the software that you lose the ability to work creatively," she says.

CIOs can also apply TQM plan-

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ning and analysis techniques directly to their departments' data. For example, the Windows-based QDB/Analyze from QDB Solutions Inc. of Cambridge, Mass., scans files for defects and alerts users to any problems. It can also generate a series of charts and reports that allow users to judge whether their departments' data quality is improving or degrading and to determine exactly where the shortcomings can be found.

Sarah Bassett, QDB's sales and marketing manager, says that programs like QDB/Analyze can be used in conjunction with other quality-management tools in a full TQM effort or by themselves simply to improve a key facet of the IS department's internal quality. "CIOs spend so much time planning and implementing a TQM project, speeding their work, organizing their workers' time and reorganizing their ways of doing business that they often neglect to concentrate on the core of their work—the data," says Bassett.

While the TQM software market offers a wide range of prepackaged choices, many IS operations opt to steer clear of commercial applications in favor of in-house solutions. Pittsburgh's Carnegie Mellon University, for example, uses a custom-developed TQM application to monitor the quality of the computing services it provides to students, faculty and administrators.

F. Meena Lakhavani, director of computing and an adjunct professor at the university's graduate school of industrial administration, says her department uses paper slips to record users' responses. The slips pose questions on various aspects of the department's activities, such as how long it took the staff to answer a request, the speed with which the job was completed and whether any required resources were unavailable at the time the request was made. The information is then fed into the system, which tabulates the responses and converts the data into a series of charts, graphs and other material that management can study and apply to its future plans.

Lakhavani says that the department had no reliable way of judging its users' satisfaction before the system was implemented. The technology helps the IS staff determine which services are receiving the heaviest use and which can be safely scaled back. "I can look at the data generated over the past several months or years and see where I have to bolster staff or requisition new hardware or services," she says. "The system has been very helpful in letting us know exactly where we stand on a number of key issues. I think the users have noticed the improvement, too."

Still, Lakhavani says she's not completely satisfied with the system. "Like TQM itself," she says, "implementing a TQM system is an ongoing process." CIO

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FYI

A Movable Beast

While laptops have long allowed business travelers to take their offices on the road, users of high-powered workstations have had to settle for less when they travel. Now Sun Microsystems Computer Corp.'s SPARCstation Voyager offers a workstation that does not sacrifice performance to portability.

At 13 pounds, the Voyager is heavier than the average PC notebook, but its configuration is also heavyweight: It features 16MB of RAM, expandable to 80MB, a 340MB hard drive and a 3.5-inch triple-density floppy drive. The Voyager also comes standard with an Ethernet connection, parallel and serial ports, a SCSI-2 port and two PCMCIA slots. An optional PCMCIA fax modem card is available. Sun says this portable workstation is at about the midrange of the SPARCstation family, performancewise.

Voyager also features an infrared

interface that lets users zap information between it and an electronic personal organizer. A new mail tool lets users remotely access electronic mail and read and respond to mail while disconnected from the network.

All system configurations are available now and include a one-year warranty. Pricing ranges from $8,995 to $14,995, depending on screen choice. Call 800 821-4643.

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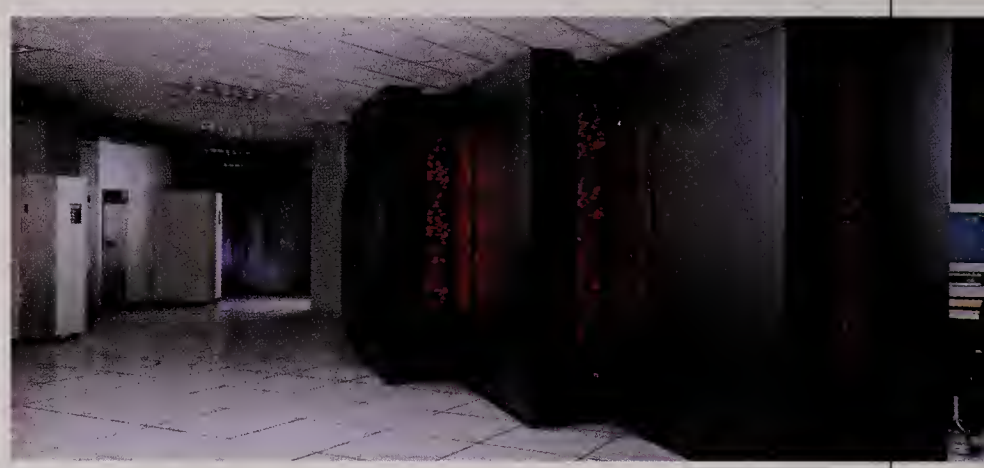
Now that you've got all kinds of customer information in your database, what will you do with it? Thinking Machines Corp. has a way to fully exploit that data. Its Intelligent Business Systems (IBS) combine the power of massively parallel-processing hardware, standard relational-database environments and the predictive capabilities of intelligent algorithms to detect subtle customer patterns and predict future behavior.

At the heart of the IBS is Darwin, an intelligent processing toolkit that uses memory-based reasoning, neural-network technology and other even more arcane methods to perform unstructured analyses of data. Unlike traditional statistical methods of data analysis, which work well with small amounts of data, the quality of the information you receive from intelligent methods is based on the amount of data analyzed: The more clues you have, the better it gets.



Darwin recognizes subtle shifts among billions of pieces of data, then uses these patterns to predict product preferences, buying habits and market tendencies. According to the company, it can predict such things as next month's demand, the 5 percent of customers most likely to respond to a mailing, or customers most likely to default on a loan. It works by creating rules to identify the set and then applying those rules to historical records.

IBS runs on the company's Connection Machine, a fully scalable, massively parallel computing system that combines RISC processing and redundant array of inexpensive disks (RAID) storage. It uses Oracle Corp.'s Oracle7 relational-database-management system and Decision/SQL, a query facility from Dharma Systems Inc. that enables all processors and disks to work cooperatively on a query. For pricing information, call Thinking Machines at 617 234-1000.

Admission Possible

Internet and friendly may sound like mutually exclusive terms, especially when it comes to exploring the global network's commercial opportunities. But The Santa Cruz Operation Inc. says its newest release can make those concepts less contradictory.

The software developer and supplier has launched SCO Global Access, a Unix software product designed to let companies plug into the Internet with less expense and fewer headaches.

The package includes NCSA Mosaic, a multimedia application that lets Net navigators point and click their way into libraries of government, academic and industry information. It also features access to E-mail and countless Internet news groups, including dozens on business, professional and technical topics.

SCO says it is the first commercial Unix system supplier to license the powerful Mosaic hypertext technology for commercial application. The company has also forged strategic alliances with Internet providers worldwide.

Global Access, a complete Unix solution for Intel CPU-based equipment, is priced at $895. Existing SCO Open Server 3.0 customers can upgrade for $195. Users of Microsoft Windows can get Internet access with the familiar Windows look with Global Access and the Wintif technology previously announced by SCO subsidiary IXI Ltd. In addition, IXI is planning to offer Global Access later this year for RISC-based platforms from Digital Equipment Corp., Hewlett-Packard, IBM Corp. and Sun Microsystems Inc.

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Company Index

AT&T 26, 55
Apple Computer Inc. 30
Aurum Software Inc. 30
Baltimore Gas and Electric 72
Baxter Health Care Corp. 40
Black & Decker Corp. 72
British Telecom 55
Carnegie Group Inc. 72
Chase Manhattan Bank 40, 55, 67
Da Vinci Systems Corp. 26
Digital Equipment Corp. 26, 40, 55, 72, 94
Ford Motor Co. 72
FourGen Software Inc. 40, 55
GRiD Systems Corp. 30
Hewlett-Packard Co. 94
IBM Corp. 16, 26, 40, 72, 94, 98
IQS Inc. 86
Incotel Inc. 26
Influence Technologies 30
Investors Group Inc. 30
J.M. Huber Corp. 40
KFC 40, 55
Kaetron Software Corp. 86
Lotus Development Corp. 26
MCI Telecommunications Corp. 26, 40, 55
Michael-Delia Inc. 86
Microsoft Corp. 72
Mrs. Fields Inc. 72
Nestec Ltd. 40, 55
Nestle Holdings 40, 55
Pacific Bell 72
PepsiCo Inc. 55
Perrier 40
Pitney Bowes Inc. 26
QDB Solutions Inc. 86
Reebok International Ltd. 40, 55
SAP AG 40, 55
Santa Cruz Operation Inc., The . . . 94
Southwestern Bell 98
Sprint 26
Storage Technology Corp. 30
Strategic Horizons Inc. 30
Sun Microsystems Computer Corp. . 94
Sun Microsystems Inc. 55, 94
Telogy Inc. 30
Thinking Machines Corp. 94
US West 72
United Parcel Service 72
Xerox Corp. 72

Advertiser Index

AAAI 96
AT&T Network Systems 49
AT&T 77, 79, 81, 83, 100
Booz-Allen & Hamilton 84
CAP Gemini Sogeti 4
CIO Publishing Inc. 26H, 95
CNBC 97
Comdisco 9
Compaq Computer Corp. 43
Computer Associates Intl. Inc. . . 2, 38
Digital Equipment Corp. C2, 99
EDS 14
Evolutionary Technologies Inc. 35
Gupta Corp. 13
Hewlett-Packard Co. 23
IBM Corp. 10, 26A, 28, 74
Information Builders Inc. 19
Informix Inc. 26G
Isogon 63
Lawson Software 17
Legent Corp. 20
MMR 90
MicroAge 6
Micro Focus C4
Minolta 66
Newbridge Networks 87
SAS Institute Inc. 54
Sequent Computer Systems Inc. . . . 64
Stratacom 25
Sun Microsystems Inc. 70
Sunsoft 32
SynOptics Communications Inc. . . . 53
Tandem Computers Inc. 58
Unisys Corp. 88
Xerox Corp. (Regional) 95

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Uniting its many schools with a reliable telecommunications system was a principal goal at this Texas school district

As in most businesses today, school systems would like to keep costs low yet increase the services they offer. While the Northside Independent School District, in San Antonio, had established these objectives, it found itself with decreasing productivity and efficiencies and a rapidly growing student body. The district determined that its information systems, consisting of a centralized mainframe computer, a few dumb terminals in each school and analog phone lines that were old and outdated, hindered its goals.

Only a few secretaries at each of the district's seven high schools, 11 middle schools, 37 elementary campuses and other facilities could access the mainframe where student and financial data reside. When an administrator needed this information, he or she had to disrupt a secretary to get it. Also, the schools had no means of communicating among themselves. In order to disseminate information such as a blood drive or an early dismissal, secretaries would have to make numerous phone calls, or an administrator might have to drive to the central office with confidential data.

The phone lines connecting the terminals to the mainframe were so poor that uploaded data would get distorted. "There were garbled, unrecognizable characters in the student records," says John Hoff, telecommunications manager. "And sometimes [users] would get knocked off the system and have to re-sign back on." As a result, secretaries often had to re-enter data.

To overcome these drawbacks, in 1991 Northside began to shift to a more distributed computing environment using digital lines. Now Northside's facilities share systems made up of six IBM RS/6000 servers and over 600 IBM 3151 terminals; the mainframe serves as a node on the network. All locations are connected via a digital communications service with a backup link from Southwestern Bell. With E-mail capabilities, interschool communication is no longer a problem.

Now administrators have terminals on their desks, allowing them to access students' grades, attendance and disciplinary records. With easier access to financial data, principals are managing their budgets better. "Instead of seeing monthly reports on different departments' budgets and what the balances are in those accounts, I can input a code and see the information on the screen immediately," says Sterling Christy, principal at the E.M. Pease Middle School. "I can make faster decisions on whether or not to order supplies, before going into the red."

Supplies are ordered electronically from a central warehouse, and the cost is automatically deducted from the school's account. "Instead of receiving supplies in one to two weeks," explains Christy, "we receive them in one to two days."

At one school, with roughly 10 more people having their own terminals, the system has reduced monthly communications charges by 30 percent. Moreover, "the upgrade has saved us many man-hours in lost downtime," says Hoff.

Northside continues to expand its applications and increase services. In the cafeterias, students use barcoded prepaid cards to purchase their lunches. In the libraries, they will soon be able to check other facilities for books and research material. And videoconferencing will enable educators to teach specialized courses, such as Russian, to a number of schools at once.

"The system is working better than we anticipated by providing faster data to more people at lower costs, more reliably," says Ernest Domel, director of management information services. "And we're adding more end users and expanding applications as we need to."

–Nancy Hitchcock

VITAL STATISTICS

Organization: *Northside Independent School District, San Antonio*

Application: *Districtwide computing and telecommunications system*

Technologies: *Six IBM RS/6000 servers and over 600 IBM 3151 terminals; Southwestern Bell's Network Reconfiguration Service digital communications link and Securenet backup communications link*

Scope: *Over 600 administrators, secretaries, principals, vice principals and guidance counselors*

Sponsor: *Ernest Domel, director of management information services*

Objective: *To better manage administrative duties, such as student records and registration; to improve communications among the many facilities*

Payoff: *More accurate data for administrators; improved communications; increased access to financial and student data; ability to provide more services*

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MicroFocus (Workbench)	40%	KnowledgeWare, Inc. (Information Engineering Workbench)	17%	Texas Instruments (Information Engineering Facility (IEF))	26%	KnowledgeWare, Inc. (Information Engineering Workbench)	14%
Intersolv (Excelerator)	15%	Intersolv (Excelerator)	9%	KnowledgeWare, Inc. (Information Engineering Workbench)	24%	Intersolv (Excelerator)	11%
Texas Instruments (Information Engineering Facility (IEF))	13%	Computer Associates (CA-REALIA)	8%	Computer Associates (CA-REALIA)	5%	Texas Instruments (Information Engineering Facility (IEF))	11%
Computer Associates (CA-Tellon)	7%	Visible Systems Corp. (Visible Analyst Workbench)	8%	Cadre Technologies, Inc. (Teamwork)	3%	Computer Associates (CA-REALIA)	5%

BEST SERVICE/ SUPPORT		BEST DOCUMENTATION		PREFER TO DO BUSINESS WITH		PLAN TO BUY	
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MicroFocus (Workbench)	26%	KnowledgeWare, Inc. (InformationEngineering Workbench)	[illegible]	KnowledgeWare, Inc. (Information Engineering Workbench)	[illegible]	KnowledgeWare, Inc. (Information Engineering Workbench)	29%

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